

FINDINGS OF FACT / CONCLUSIONS

UNITED STATES BANKRUPTCY COURT
FOR THE DISTRICT OF COLUMBIA

In re

INSLAW, INC.,

Debtor.

Case No. 85-00070
(Chapter 11)

INSLAW, INC.,

Plaintiff,

v.

UNITED STATES OF AMERICA
AND THE UNITED STATES
DEPARTMENT OF JUSTICE,

Defendants.

Adversary Proceeding
No. 86-0069

CLIN/FI-01

FINDINGS OF FACT AND CONCLUSIONS OF LAW

(Counts I, II and III of the Complaint)

[The following paragraphs are numbered as
they appear in the United States Bankruptcy
Court's Findings of Fact]

VII. BREWER'S USE OF MODIFICATION 12 "TO GET INSLAW'S GOODS"

A. NEGOTIATION OF MODIFICATION 12

229. The DOJ persisted in its attempts to interrelate resolution of the advance payments issue and INSLAW's assertion of proprietary rights in Enhanced PROMIS. (PX 62; PX 66) When it became clear to INSLAW in March 1983 that DOJ would not resolve the advance payment issue without first obtaining the PROMIS

software, INSLAW proposed in a March 11, 1983 letter to DOJ that the parties enter into an escrow agreement pursuant to which DOJ would receive the software if, and only if, INSLAW went into bankruptcy. (PX 68; Hamilton, T. 167-168; Brewer, T. 1693-1694; Merrill, T. 791) Brewer's and Videnieks' professed concern about INSLAW's financial viability was merely a smoke screen; such concerns would have been fully met by placing the PROMIS software in escrow with a third party. The only reason such an arrangement was not acceptable to DOJ was because it wanted to "get" INSLAW's "goods." This is further evident from the exchange of correspondence from Mr. Rugh whereby the Department having gotten the goods, pretended to find fault with INSLAW's methodology for proving private funding while refusing to divulge to INSLAW either any realistic purported defects in that methodology or any alternative methodology which would be acceptable to DOJ. DOJ thus took the tack designed to be the most harmful to INSLAW without any conceivable concomitant benefit to the Government other than the desire to get away with taking something without right.

231. A March 28 memo further recounts that Videnieks was in full agreement with Brewer about the letter, indicating quite significantly '... why do you need signature if you got the goods?' (PX 73; Videnieks, T. 1837-1838)

* * *

271. After Rooney left the PROMIS Oversight Committee meeting, and based upon the urging of Brewer and his staff and notwithstanding Rooney's favorable conclusions about a constructive resolution to the word processing problem, and the fact that that was an initiative arranged by Deputy Attorney General Schultz, Jensen approved a decision to begin termination of the contract for default. (Richardson, T. 644, 698; PX 339 (Stephens] at pp. 25-26; PX 341 (Tyson] at pp. 175-178)

There was every indication that the meeting would lead to constructive resolution of the problem. (Richardson, T. 644-645).

312. The Executive Office reported directly to Jensen when he was Associate Attorney General and then began reporting directly to the Deputy Attorney General when Jensen was promoted to that position. (Brewer, T. 1661-1662; Tyson, T. 1534-1535).

313. About the time that Jensen was promoted to Associate Attorney General, ranking DOJ official on the PROMIS Oversight Committee and immediate organizational superior of the Executive Office, Videnieks first suspended the payment of costs to INSLAW under the PROMIS Contract. (PX 98) The July 18, 1983, letter to INSLAW from Contracting Officer Videnieks, that sought to justify the suspension of almost a quarter of a million dollars in payments due INSLAW under the Contract, showed Associate Attorney General Designate Jensen as the number one "cc". (PX 98) Videnieks testified that he never met Jensen and cannot account for why he copied the payment suspension letter to Jensen but

failed to copy the DOJ Director of Procurement, his immediate superior. (Videnieks, T. 1869-1871)

* * *

316. In December 1983, INSLAW counsel Richardson met with Assistant Attorney General Rooney in an attempt to resolve both the payment-suspension problem and a word processing hardware problem. There was every indication that the meeting would lead to constructive resolution of the problems. (Richardson, T. 641-644).

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320. In February 1984, Brewer telephoned Hamilton to tell him that Jensen had just decided to terminate the word processing part of the INSLAW contract for convenience. (Hamilton, T. 207)

* * *

323. Elliot Richardson and Don Santarelli visited Acting Deputy Attorney General Jensen on March 13, 1985, to ask for an immediate investigation into INSLAW's complaints about Brewer; a process for fair and expeditious resolution of the contract disputes that had propelled INSLAW into bankruptcy; and DOJ consideration of the larger public interest involved in preserving INSLAW as a unique asset for both U.S. Attorneys and

the state and local prosecutors and courts. (Richardson, T. 658-660; PX 328 [Jensen] at pp. 22-24).

324. Jensen appointed his aide, Jay Stephens, to follow through on the matters raised by Richardson and Santarelli. (PX 328 [Jensen] at pp. 24-25, 37-38; PX 339 [Stephens] at p. 40; Richardson, T. 661)

325. Although Jensen testified that he believed an investigation of Brewer's conduct against INSLAW had been conducted, in fact neither Stephens nor the designated agency ethics officer ever conducted such an investigation. (PX 328)[Jensen] at PP. 25-26; PX 339 [Stephens] at pp. 47-48; PX 343 [Wallace] at pp. 44-46, 210-211; Sposato, T. 2267-2270).

* * *

339. On May 2, 1983, Hamilton met with William Tyson to complain about the biased administration of the PROMIS Contract on the part of Brewer and Videnieks, and to state that Brewer's conduct may be the result of a lack of impartiality against Hamilton for having previously fired Brewer. (Hamilton, T. 199; PX 341 [Tyson] at pp. 136-138, 140-142, Tyson, T. 1531-1532, 1550-1551) Hamilton specifically identified ten to twelve incidents which appeared to have been the result of Brewer's bias, including Brewer's conduct at the April 19, 1982 meeting in connection with the BJS contract and the spreading of false information concerning INSLAW's financial condition among personnel in various U.S. Attorney's offices. (Hamilton, T.

199-201) Tyson responded that he took seriously these sort of allegations and that he would conduct an inquiry. (Hamilton, T. 202; Tyson, T. 1554-1555) Again, no referral to OPR occurred, nor did Tyson do anything other than to ask McWhorter whether Brewer had been fired by the Institute. (PX 341 [Tyson) at pp. 140-142; Tyson, T. 1552, 1556; Hamilton, T. 208) INSLAW never even got a report back from Tyson on this matter. The government began to suspend payments on its contract cost expenses later on in May 1983. (Hamilton, T. 208; Tyson, T. 1554-1555).

351. This Court has found, (i) in an extended bench ruling on June 12, 1987 (which is incorporatated herein by reference), as a result of four days of hearing in In re INSLAW, Inc., Case No. 85-00070, at which DOJ appeared and offered evicence, (ii) in an Order dated July 20, 1987, and (iii) in Findings of Fact and Conclusions of Law issued on this date in that case, and this Court incorporates into these findings in this adversary proceeding the following:

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(b) Sometime between February 7 and February 20, 1985, Brewer discussed the INSLAW Chapter 11 bankruptcy case with Thomas J. Stanton, Director of the Executive Office of United States Trustee ("EOUST"). At the time of Brewer's discussion

With Stanton, Eoust and DOJ believed that they had an interest in seeing that INSLAW was liquidated in order to weaken or eliminate INSLAW's ability to press its contract disputes with DOJ. As a result of the discussion, Stanton made a commitment to Brewer that he would undertake to cause the conversion of INSLAW's Chapter 11 case to a Chapter 7 liquidation case.

(d) Acting on his commitment to Brewer, Stanton contacted William C. White, the local United States Trustee whose office had jurisdiction over the INSLAW bankruptcy, and pressured him to convert the case to a Chapter 7 liquidation. When White resisted, Stanton sought to have the office of Cornelius Blackshear, then the United States Trustee for the Southern District of New York, detail Blackshear's assistant trustee, Harry Jones, to Eoust, Washington, D.C., where Jones would be assigned to accomplish the conversion. Blackshear refused to permit this.

(g) The fact of Stanton's commitment to Brewer to seek INSLAW's liquidation was relayed by Brewer to Rugh on or before February 20, 1985. Brewer told Rugh that Stanton had said the INSLAW bankruptcy would be converted to a Chapter 7 liquidation within 30 to 60 days. On February 20, 1985, acting on

this information, Rugh telephoned Peter Videnieks, the Contract Officer on the PROMIS contract, and told him that Brewer had talked to Stanton and that there was 'no way' the INSLAW bankruptcy would continue as a Chapter 11 case and that INSLAW probably would be liquidated within 30 to 60 days. Rugh told Videnieks that in view of the impending liquidation, DOJ would need to obtain a new site for the Government computer then on INSLAW's premises in Lanham, Maryland.

(h) On or about February 21, 1985, Rugh telephoned Gregory McKain, a senior INSLAW software programmer who had worked on the PROMIS contract since its inception, and told them that EOUSA had found out from the 'trustees' that INSLAW could not make it in Chapter 11 and that the company would probably go into Chapter 7 in 30 to 60 days. Rugh then discussed with McKain the possibility of working for DOJ on the remainder of the PROMIS project under a six-month sole source contract, assuming INSLAW did go out of business.

352. Rugh of DOJ's Executive Office attempted to recruit an INSLAW software engineer during the month INSLAW filed for protection, telling the INSLAW employee, Gregory McKain, that the 'trustees' had told the Executive Office that INSLAW would probably be liquidated within 30-60 days.

* * *

362. DOJ converted INSLAW's Enhanced PROMIS by trickery, fraud and deceit, and DOJ has used and continues to use Enhanced PROMIS not only in the 20 U.S. Attorney's offices entitled to use a different non-proprietary version of PROMIS, but also in approximately 25 other U.S. Attorney's offices.

* * *

398. During the trial of this matter, the Court observed the witnesses very closely and reached certain definite and firm convictions based on the demeanor and expressions of those witnesses, as well as on an analysis of the inherent probability or improbability of their testimony in light of the documentary evidence and other known facts. Accordingly, the Court makes the following general findings with respect to such trial witnesses, although the comments expressed herein should not be interpreted as being fully inclusive:

(a) The testimony of William Hamilton was accurate in all or almost all respects, even taking into account the natural human tendency to emphasize those things favorable to one's own cause. Mr. Hamilton was an impressive witness with an exceptionally good memory and an extraordinary ability to remember with precision details of events that occurred years ago.

(b) The testimony of John Gizzarelli was accurate in all major respects. Although his recollection was not as good as

Hamilton's recollection, it is impossible for the Court to conclude that Gizzarelli was inaccurate in his detailed, and substantiated testimony describing Brewer's intense hatred of Hamilton. Gizzarelli is no longer an employee of INSLAW, and there was no reason for him to slant his testimony to one side or the other.

(c) The testimony of Elliot Richardson was very impressive. The Court found Richardson to be of high integrity and his testimony to be absolutely reliable.

(d) The testimony of James Rogers, Dean Merrill, Harvey Sherzer, Bellie Ling and Marian Holton was straightforward and consistent with the known facts.

(e) The Court was impressed with the credentials and expertise of Thomas DeLutis, INSLAW's expert witness. The Court believes DeLutis to have conducted himself with a tenable aura of impartiality and finds the DeLutis testimony to be very believable.

(f) The testimony of Laurence McWhorter was totally unbelievable for a number of reasons. First, McWhorter could not remember anything other than a 30-second telephone call that he had with Hamilton before the contract was entered into. On cross-examination, it was brought out that McWhorter had testified at his deposition that he repeatedly could not recall virtually anything related to the contractual relationship between the parties, notwithstanding that he supposedly had supervisory responsibility over this relationship and over Brewer. Second, McWhorter's testimony was contradicted by

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Hamilton and also by his supervisor, William Tyson. Third, Brewer was a member of McWhorter's wedding party and had advanced money to McWhorter in the form of buying into a real estate partnership with McWhorter.

(g) The testimony of James Kelley was not believable. His hatred of Hamilton oozed from every pore; it was tangible and palpable. The Court finds that Kelley was a very bitter man who was eager to find any loophole that might exist to evade his ethical responsibilities as a lawyer not to reveal the confidences of a former client. Kelley showed that he was eager to say anything to harm Hamilton as long as it would sound plausible. In addition, Kelley is heavily involved with a company at least partially in competition with INSLAW and he is a friend or acquaintance of Brewer.

(h) The testimony of Jack Rugh also was not believable. Rugh was a biased witness whose testimony was tainted by the negative effect Mr. Brewer and his lack of impartiality had upon Mr. Rugh. Mr. Rugh also was biased in view of his ambitions to carry on the PROMIS Project in-house. Moreover, his testimony is at odds with the written PROMIS contract in several important particulars. For example, § 3.2.4.3. of the contract provides that INSLAW was required to provide 'error-free' software which Rugh mistakenly believed required INSLAW to fix any 'bugs' in the software regardless of who reported such bugs. This is contrary to the contract and is totally inconsistent with the logic of competitive bidding. As Hamilton pointed out in his testimony, INSLAW would be at a significant disadvantage to another company

attempting to get the PROMIS contract because the other company would have no other customers making bug fix demands whereas INSLAW would have to be including in DOJ's software all bug fix demands made by its customers or third parties other than DOJ. In addition, Rugh "interpreted" the contract to continue in effect as to all 94 offices even after the 74 office word processing phase of the contract was cancelled. This construction is implausible, as was Rugh's denial of Brewer's bias which was evidenced again and again during the course of the contract. Finally, Rugh suffered from the collective amnesia that many of DOJ's witnesses were suffering from and this is further evidence of his unreliability.

(i) The testimony of William Tyson was not believable. His testimony that Brewer's attitude toward INSLAW was positive, constructive and favorable is so ludicrous in light of the evidence taken as a whole that it was difficult for this Court to believe any of Mr. Tyson's testimony. Tyson displayed an extraordinarily blase attitude toward serious allegations of personal bias by Brewer towards Hamilton and INSLAW, and did little, if anything, to discharge his responsibilities as Brewer's superior to investigate these allegations.

(j) The testimony of C. Madison Brewer was most unreliable, and entirely colored by his intense bias and prejudice against Hamilton and INSLAW.

(k) The testimony of Robert Whiteley and Vito DiPietro was generally truthful, although they tended to slant certain of their testimony in favor of their employer.

(l) The testimony of Peter Videnieks was substantially unreliable. Videnieks was under Brewer's domination and was thoroughly affected by Brewer's bias. In addition, Videnieks displayed an amazing lack of recollection of pertinent facts, especially in regard to the very detailed notes which he maintained in respect to this matter. It is obvious that Videnieks acted at the bidding of Brewer and that his attitude toward INSLAW was directly the consequence of Brewer's influence on him.

(m) The testimony of James Mennino was absolutely incredible. It was totally unsubstantiated and obviously biased. The Court infers from the evidence as a whole that Mennino sought to obtain a copy of PROMIS software from DOJ by offering to provide DOJ with false information that Mennino believed would injure INSLAW. Mennino failed to substantiate his charges against INSLAW at the time these charges were originally made, even though DOJ requested substantiation at that time. Moreover, Mennino failed to bring any substantiating information to trial, notwithstanding his testimony that such information was available.

(n) The testimony of Ugo Gagliardi, DOJ's expert witness, is entitled to little weight and should be thoroughly discounted for several reasons. First, Gagliardi was heavily influenced in his view of the case by a viciously inaccurate characterization of INSLAW's position in this case provided by Rugh. Second, Gagliardi assumed the role of an advocate for the government and there was not even a pretense of impartiality in his testimony.

Finally, Gagliardi reached speculative conclusions on the basis of inadequate factual premises.

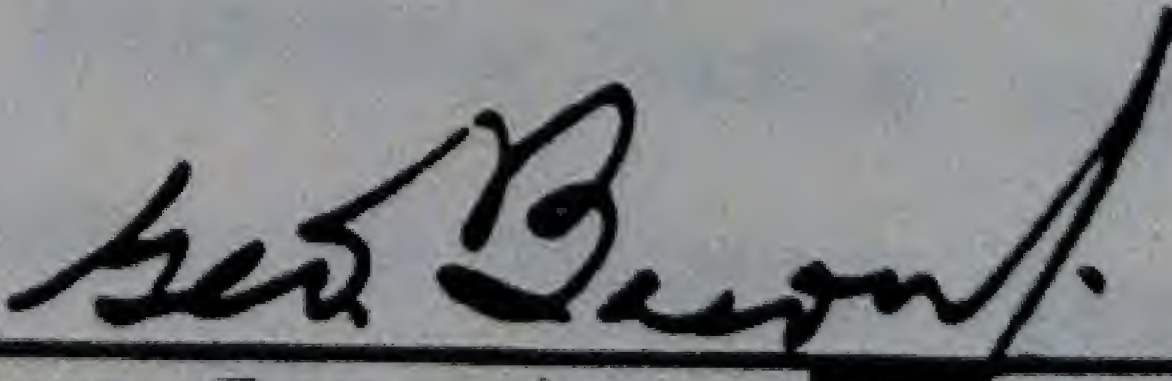
(o) The testimony of Alan Gibson was basically believable, except as otherwise noted in these Findings, although he is not an expert qualified to give an opinion concerning the adequacy of INSLAW's methodology for determining the source of funding for individual enhancements to the premised software.

(p) The testimony of Janis Sposato is to be viewed with considerable skepticism. Given Sposato's position as a DOJ ethics officer, her casual treatment of repeated serious allegations of outrageous misconduct by Brewer can only be described, even charitably, as willful blindness to the obvious.

(q) The testimony of Geraldine Schacht and Joyce DeRoy was substantially believable, and the Court has no indication that they were biased or would have any reason to favor either party.

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399. The acts of DOJ as described in the foregoing findings of fact were done in bad faith, vexatiously, in wanton disregard of the law and the facts, and for oppressive reasons -- to drive INSLAW out of business and to convert, by trickery, fraud and deceit, INSLAW's PROMIS software.



George Francis Bason, Jr.
United States Bankruptcy Judge.

(a) The Commission shall actively seek qualified private contractors to construct and operate authorized hazardous waste facilities. A contractor may both construct and operate a facility.

(b) The Commission shall select and employ qualified contractors to construct and operate each hazardous waste facility, or shall construct the facility itself and/or designate itself as the operator.

(c) The Commission shall enter into and enforce an agreement with each contractor for each hazardous waste facility which shall incorporate such terms and conditions as the Commission determines are necessary and consistent with the purposes of this Chapter. Such agreement shall contain adequate assurances of contractor performance through the use of bonds, insurance, and shall require substantial compliance with all applicable federal and State law, including statutes, regulations, and rules. The Commission shall provide for an independent annual audit of the collection of all fees and other charges.

(d) The Commission may, in its discretion, seek the advice and assistance of other State agencies or private consultants in selecting contractors.

(e) The Commission may suspend or terminate its agreement with any contractor for a hazardous waste facility for any breach thereof. In the event of suspension or termination of an agreement, the Commission may select an interim or replacement contractor, or may operate the facility itself, to ensure that the facility is properly maintained and operated in compliance with all applicable federal and State laws, including statutes, rules, and regulations.

(f) The Commission shall periodically review and amend its agreement with the operating contractor of each hazardous waste facility to reflect necessary changes in fees or other charges, new environmental requirements, additional bonding or insurance requirements, or other alterations deemed necessary or appropriate.

"§ 130B-14. Technology, design capacity, and license application.

(a) The Commission shall, with the assistance of other State agencies or private consultants it deems appropriate, recommend to the Governor the technology and design capacity of each component of each hazardous waste facility to be operated pursuant to this Chapter. Upon approval of technologies and design capacities by the Governor, the Commission shall prepare, or direct the operator to prepare subject to approval by the Commission, detailed designs and specifications, operating procedures, safety plans, closure plans and other plans necessary for hazardous waste facilities operated pursuant to this Chapter.

(b) Each operator of a hazardous waste facility established pursuant to this Chapter shall, under the supervision of the Commission, prepare and submit applications for all permits and licenses required for the facility to the appropriate regulatory agencies.

(c) The Department is designated as the lead State agency for overall coordination of the review of the application process and ensuring that decisions by the affected State agencies are rendered in a timely manner.

"§ 130B-15. Facility closure; post-closure control.

(a) The Commission shall enter into an agreement with the operator of each hazardous waste facility established under this Chapter for the safe and proper closure of the facility.

(b) The Commission shall, with the assistance of other State agencies and private consultants it deems necessary, approve the operator's site closure plan. The approval of the Commission under this section is in addition to the approval of the Department in accordance with the rules and regulations of the Commission for Health Services. The Commission may employ an independent contractor to do anything necessary to properly close a hazardous waste facility and to ensure that the site is stabilized.

(c) The Commission shall provide for such post-closure physical surveillance and environmental monitoring of each hazardous waste facility or facility site operated pursuant to this Chapter as may be required by the Department or by agreement with the host community.

(d) The Commission shall reimburse, or assure that the operator reimburses, appropriate State agencies for the costs of physical surveillance and environmental monitoring or other post-closure services rendered.

(e) The Commission shall provide through its own personnel, private contractors, cooperative agreement with other governmental agencies, or any combination thereof, any active maintenance or remedial actions that may be required. Payment for the cost thereof shall be made from the Long-Term Care Fund established pursuant to G.S. 130B-16.

"§ 130B-16. Fees.

(a) It is the intent of the General Assembly that all costs associated with the development of hazardous waste facilities pursuant to this Chapter be borne by the waste generators served by such facilities. The General Assembly recognizes that the extent to which costs can be passed to hazardous waste generators is determined in part by market forces, since hazardous waste facilities must operate in a competitive market. In establishing and revising schedules of fees, the Commission shall seek to secure the greatest possible revenue for the State and units of local government consistent with environmentally safe and economically sound facility operation. In establishing and revising schedules of fees, the Commission may seek to encourage reductions in the volume or quantity and toxicity of hazardous waste. For facilities which it operates, the Commission shall establish, and revise as necessary, schedules of fees and other charges, including user charges, penalties, and surcharges. For facilities which are operated by private enterprise pursuant to this Chapter, the Commission shall establish, and revise as necessary, schedules of franchise fees. The terms and conditions under which facilities are operated by private enterprise pursuant to this Chapter shall be governed by appropriate contracts between the Commission and the private operators. Such contracts shall provide for the payment of franchise fees and for the periodic adjustment thereof.

(b) In establishing and revising schedules of fees the Commission shall consider and shall seek to recover to the maximum extent possible, the following costs:

- (1) Establishment and operation of the Commission;
- (2) Reimbursement of State agencies for costs incurred on behalf of the Commission or in support of its activities, including the costs of any services performed pursuant to G.S. 130B-15;
- (3) Establishment and administration of the Long-Term Care Fund under G.S. 130B-17;
- (4) Repayment to the State with interest at rates which are equal to those set by the State Treasurer with respect to savings certificates and certificates of deposit, at the varying rates applicable for the period between expenditures and repayment, of all funds expended from the General Fund to develop hazardous waste facilities pursuant to this Chapter;
- (5) Funding of the State's share of the costs associated with any interstate agreement or compact for hazardous waste management to which the State may become a party;
- (6) Compensation of contractors and consultants employed by the Commission;
- (7) Other expenses incurred by the Commission, the State or its agencies in furtherance of the purposes of this Chapter; and

- (8) Compensation of any property owner for any loss in value of property directly resulting from the siting or operation of a hazardous waste facility.

(c) In the event that revenues exceed all costs set out in subsection (b) of this section and all other costs and charges for which the Commission is liable, such excess funds shall be paid into the General Fund. It is the intent of the General Assembly that such excess funds be appropriated for the following purposes:

- (1) Funding of a portion of the State's share of the costs for remediation of inactive hazardous sites under Part 3 of Article 9 of Chapter 130A of the General Statutes and under CERCLA/SARA; and
- (2) Funding of a portion of the cost of the Pollution Prevention Pays Program, the waste minimization program administered by the Technical Assistance and Support Unit of the Solid Waste Management Division of the Department, other programs which foster multimedia waste prevention, reduction, reuse, and recycling, and programs which provide assistance to small quantity generators.

(d) The Commission shall prepare, on a quarterly basis, a detailed financial statement showing its current fee schedules, income from all sources, indebtedness, and expenses for the quarter and fiscal year to date. This statement, and any other information regarding the operation or activities of the Commission which may be requested, shall be submitted to the chairmen of the House and Senate committees on Finance and Appropriations, the Joint Legislative Commission on Governmental Operations, the Environmental Review Commission, the Research Division, and the Fiscal Research Division of the General Assembly.

(e) An operator of a hazardous waste facility may serve as the collection agent for the Commission, in which case, funds collected by the operator shall be transferred to the Commission on a timely basis, and deposited with the State Treasurer, as directed by the Commission.

(f) All Commission accounts shall be audited pursuant to the provisions of Article 5A of Chapter 147 of the General Statutes.
"§ 130B-17, 'Long-Term Care Fund,'

(a) For hazardous waste facilities owned or operated by the Commission, there is hereby established under the control and direction of the Commission a nonreverting Long-Term Care Fund, to be administered by the State Treasurer, which may be used for:

- (1) Administration of the Fund;
- (2) Emergency response and decontamination at facilities operated by the Commission; or
- (3) Post-closure physical surveillance, environmental monitoring, maintenance, care, custody, and remedial action at hazardous waste facility site(s) operated by the Commission.

(b) The Long-Term Care Fund shall be treated as a special trust fund and shall be credited with interest by the State Treasurer pursuant to G.S. 147-69.2 and G.S. 147-69.3.

(c) In addition to any money that may be appropriated or otherwise made available to it, the Fund may be maintained by fees and other charges including user charges, penalties, surcharges, or other money paid to or recovered by or on behalf of the Commission under the provisions of this Chapter. Fees and other charges shall at all times be sufficient to build and maintain the Fund balance at a level determined by the Commission, with the concurrence of the Commission for Health Services, to be adequate for the purposes stated in this section.

(d) The establishment of this Fund shall in no way be construed to relieve or reduce the liability of any facility operator, contractor, or other person for damages resulting from the operation of a hazardous waste facility.

"§ 130B-18. Taxes; other compensation to the State and local governments.
(a) Hazardous waste facilities or portions of such facilities which are owned by the Commission shall be exempt from ad valorem property taxes; provided however, that the Commission shall, in lieu of such property taxes pay to any governmental body authorized to levy such property taxes the amount that would be assessed as taxes on real and personal property of such facilities if such facilities were otherwise subject to valuation and assessment by local taxing unit. In addition, the Commission shall reimburse the county, city, or other local taxing unit for the loss of ad valorem property tax revenues from any property located on any parcel or tract that abuts the property upon which such facilities are located and which is shown to have diminished in value as the direct result of the siting and operation of such facilities. Such payments in lieu of taxes shall be due and shall bear interest if unpaid, as in the case of taxes on other property. Payments in lieu of taxes made hereunder shall be treated in the same manner as taxes for purposes of all procedural and substantive provisions of law. Administrative buildings, associated land, and other real and personal property owned by the Commission and not located at a hazardous waste facility shall be exempt from property taxes as provided in G.S. 105-278.1.

(b) Except as authorized in G.S. 153A-152.1, G.S. 160A-211.1 and this Chapter, no county, city, or other local taxing unit may impose any tax, fee, assessment, or levy of any kind or description upon the Commission or the operator of a hazardous waste facility or any portion thereof which is owned by the Commission. Any hazardous waste facility or portion thereof which is separately taxable and which is not owned by the Commission may be taxed on the same basis as any other property. To the extent that any law, ordinance, or portion thereof is in conflict with this subsection, such law, ordinance, or portion thereof is hereby invalidated.

(c) The Commission shall collect and deposit with the State Treasurer, on behalf of local governments where hazardous waste facilities are located pursuant to this Chapter, a tax on the gross receipts of each such facility in the amount of two and one-half percent (2.5%) of the gross receipts of such facility per annum, to be distributed to local governments as the General Assembly shall provide. The Commission shall develop and recommend to the General Assembly a proposed revenue package and revenue distribution formula which the General Assembly shall consider in providing for distribution of this tax and such other revenues as may be collected.

"§ 130B-19. Site designation review committees.

(a) The board of commissioners of each county in which there is located a site identified for evaluation pursuant to G.S. 130B-11(d) may appoint a site designation review committee for a hazardous waste facility. The committee shall consist of 11 members representing, insofar as possible, local government, environmental, health, engineering, business and industry, academic, public interest, and emergency response groups. The committee shall elect a chairman, vice-chairman, and a secretary. Vacancies shall be filled by the county board of commissioners using the same criteria employed in the original appointment. Members shall be reimbursed by the committee for reasonable and necessary expenses incurred in connection with their duties. The county shall provide the committee with necessary support staff.

(b) The committee shall advise the county board of commissioners on matters relating to the siting of a hazardous waste facility.

(c) All site designation review committees shall terminate upon the designation of the preferred site by the Commission.

who the committee
advised

(d) Subject to appropriation by the General Assembly, the Board may provide technical assistance grants of up to fifty thousand dollars (\$50,000) to each site designation review committee. In the event that a proposed site is located in more than one county, or that one or more site designation review committees are appointed pursuant to subsection (h) of this section, the Board may provide technical grants to a site designation review committee in each county, provided that the maximum amount the Board may grant to all site designation review committees for a particular site is seventy-five thousand dollars (\$75,000).

(e) Grant funds may be used by the committee to:

- (1) Collect information on site suitability;
- (2) Monitor the site evaluation and site selection process;
- (3) Conduct socioeconomic and environmental assessments of the proposed facility;
- (4) Participate in any meetings, hearings, or other events related to the site selection process;
- (5) Study the cost and benefits of the facility being located at the site under consideration; and
- (6) Reimburse members for their expenses as provided in subsection (a) of this section.

(f) Any reviews or studies funded with grant monies shall be completed prior to the date set by the Commission for nomination of a preferred site.

(g) The Commission shall consider in its decision-making process recommendations or other information of the site designation review committee as may be transmitted to the Commission by the county board of commissioners.

(h) A site designation review committee may also be appointed as provided by this section by the board of commissioners of any county whenever the board of commissioners determines that the county may be affected by the siting of a hazardous waste facility in another county.

(i) No grant funds shall be used for litigation expenses. Each site designation review committee shall properly account for all funds. Unexpended funds shall revert to the Board, and at the end of the biennium shall revert to the General Fund.

"§ 130B-20. Preferred site local advisory committees.

(a) Upon designation of a preferred site for a hazardous waste facility pursuant to G.S. 130B-11(d) the board of commissioners of each county within whose jurisdiction the site is located may appoint a preferred site local advisory committee. The committee shall consist of 11 members representing insofar as possible local government, environmental, health, engineering, business and industry, academic, public interest, and emergency response groups. The committee shall elect a chairman, vice-chairman, and a secretary. Vacancies shall be filled by the county board of commissioners using the same criteria employed in the original appointment. Members shall be reimbursed by the committee for reasonable and necessary expenses incurred in connection with their duties. The county shall provide the committee with necessary support staff.

(b) The preferred site local advisory committee may:

- (1) Study the costs and benefits associated with the proposed facility;
- (2) Review all permit and license applications and related documents concerning the proposed facility;
- (3) Hire program, technical, and legal consultants to assist in the review process;
- (4) Collect and review information required for issuance of a special or conditional use zoning permit;
- (5) Assess the potential local environmental and socioeconomic impacts of the proposed facility;

- (6) Promote public education, information, and participation in the permitting process;
- (7) Develop and propose agreements between the Commission, the hazardous waste facility operator, local governments, and other persons;
- (8) Develop and present recommendations concerning permit conditions, operational requirements, compensation, and incentives related to the proposed facility;
- (9) Hire a mediator to facilitate negotiations among the Commission, the hazardous waste facility operator, local governments, and other persons; and
- (10) Reimburse committee members for reasonable and necessary expenses.

(c) An applicant for a permit to operate a hazardous waste facility pursuant to this Chapter shall pay a one-time local application fee of one hundred thousand dollars (\$100,000) to the Board. The Board shall distribute not less than sixty-five thousand dollars (\$65,000) of the local application fee to the county or counties where the site of the proposed facility is located. If the site lies in more than one county, the local application fee will be distributed to the counties in which the site is located in equal amounts. If the board of commissioners appoints a preferred site local advisory committee the local application fee shall be used to support the work of the committee.

(d) A preferred site local advisory committee may also be appointed as provided by this section by the board of commissioners of any county whenever the board of commissioners determines that the county may be affected by the siting of a hazardous waste facility in another county. If a preferred site local advisory committee is appointed pursuant to this subsection, the committee may apply to the Board for a portion of the local application fee to support the work of the committee. The Board may allocate up to twenty-five thousand dollars (\$25,000) to each preferred site local advisory committee appointed pursuant to this subsection, provided that the maximum amount that the Board may allocate to all preferred site local advisory committees appointed pursuant to this subsection for a particular site is thirty-five thousand dollars (\$35,000). The Board shall base allocations under this subsection on the likelihood that the proposed hazardous waste facility will have a significant effect in the county, taking distance to the facility and other factors into account. Decisions of the Board regarding allocations under this subsection are final. Any portion of the local application fee which is not allocated by the Board under this subsection shall be distributed by the Board to the county or counties where the site of the proposed facility is located as provided in subsection (c) of this section.

(e) Each preferred site local advisory committee shall properly account for all funds. Any unexpended funds shall revert to the general fund of the county which appointed the preferred site local advisory committee. No portion of the local application fee shall be used to finance litigation expenses.

§ 130B-21. Negotiation, mediation, and arbitration.

(a) Any local government in the county or counties where a hazardous waste facility is proposed to be located pursuant to this Chapter may negotiate with the Commission with respect to any issue relating to the facility except:

- (1) The need for the facility;
- (2) Any proposal to reduce the duties of the Commission under this Chapter or under any permit or license issued for the facility;
- (3) Any proposal to reduce the duties of the Commission for Health Services or the Department, or to make less stringent any rule of the Commission for Health Services;



State of North Carolina
Department of Environment, Health, and Natural Resources
Division of Epidemiology
P.O. Box 27687 • Raleigh, North Carolina 27611-7687

James G. Martin, Governor
William W. Cobey, Jr., Secretary

J. N. MacCormack, M.D., M.P.H.
Director

(919) 733-3410

June 27, 1990

MEMORANDUM

RECEIVED
JUN 28 1990

TO: Edythe McKinney
Assistant Secretary
Environmental Protection

THROUGH: Ronald H. Levitt, M.D., M.P.H.

FROM: C. Gregory Smith, M.D., M.P.H.
Medical Epidemiologist
Environmental Epidemiology Section

SUBJECT: Summary of Investigation of Health Issues Related to the Caldwell Systems Incorporated Hazardous Waste Incinerator

ASSISTANT SECRETARY
ENVIRONMENTAL PROTECTION

As per your recent request to provide a summary of the Environmental Epidemiology Branch's (EEB) investigation of the Caldwell Systems Incorporated (CSI) incinerator facility, the Environmental Epidemiology Section has prepared the enclosed report referenced above. The report, developed and reviewed by a committee of Environmental Epidemiology Section staff, contains the following information:

- (1) A chronological narrative summary describing the results of all of the EEB's investigations related to CSI.
- (2) A narrative discussion of how the results of the EEB's studies compare to those obtained by EPA and others.
- (3) Concluding thoughts and comments related to the CSI facility as it relates to current efforts to site a new incinerator.
- (4) Pertinent documents supporting various components of the narrative summary.

I hope this information is helpful.

CGS:lp

Enclosure

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A Summary Report to the State Health Director
on the Environmental Epidemiology Branch's Investigation
of Health Issues Related to the
Caldwell Systems Incorporated Hazardous Waste Incinerator

Prepared and Reviewed by:

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Division of Epidemiology

INVESTIGATION OF HEALTH ISSUES RELATED TO THE CALDWELL SYSTEMS
INCORPORATED HAZARDOUS WASTE INCINERATOR

BACKGROUND

From October 1986 to July 1987, the Environmental Epidemiology Branch (EEB) in the Department of Human Resources (DHR), now the Environmental Epidemiology Section (EES) in the Department of Environment, Health, and Natural Resources (DEHNR), a non-regulatory health risk assessment branch, received multiple requests to investigate reports of adverse health effects experienced by residents living near the Caldwell Systems Incorporated (CSI) hazardous waste incinerator. These requests for assistance were made by: (1) individual citizens (some of these complaints were made initially to the Air Quality Section in the Department of Natural Resources and Community Development (DNRCD) and to the Solid and Hazardous Waste Management Branch (SHWMB), subsequently the Solid Waste Management Section (SWMS) in DHR and currently the Division of Solid Waste Management (DSWM) in DEHNR; these agencies referred them to the EEB); (2) a Caldwell County primary care physician, Dr. Marc Guerra; (3) the Caldwell County Health Director, Dr. Marjorie Strawn; (4) the Caldwell County Medical Society; and (5) locally elected public officials.

The EEB received an initial complaint of adverse health effects from a local resident in October 1986 which it began to investigate. Beginning in January 1987, Dr. Guerra, the local primary care physician, related (during numerous phone calls to multiple EEB staff) that he had one patient with high (toxic) levels of chromium in his blood, and he alleged that many of his patients were suffering from respiratory illnesses which he felt were initiated or exacerbated by exposure to emissions from the CSI incinerator. He also reported the existence of occupational illnesses in workers at the facility, birth defects in children of wives of workers, and made statements that there seemed to be a high incidence of birth defects, infant mortality, lupus, arthritis, and other diseases around the facility. In addition, he said that a young child who died of leukemia had an autopsy performed and the results indicated that she had elevated body burdens of heavy metals. The EEB made repeated verbal and written (February 5, May 7, and June 26, 1987) requests to obtain clinical records and laboratory reports from Dr. Guerra which would validate his clinical findings and allegations.

During the time period of February-May 1987, the EEB obtained background information on the CSI incinerator, conducted a review of the scientific literature on real and potential hazards associated with the incineration of hazardous waste, and began an environmental monitoring study of soil and water near the facility.

Following directives issued by the Caldwell County Commissioners and the Caldwell County Board of Health on May 13, 1987, the county health director formally requested the EEB's assistance in conducting a comprehensive investigation of real or potential health risks associated with the facility.

On May 18, 1987, the EEB received specific medical information from Dr. Woodhall Stopford, an occupational medicine physician at Duke University Medical Center (DUMC), who recently had evaluated one of the local residents (See Section 8). This information supported a causal link between reactive airways disease (an asthma-like respiratory illness characterized by bronchoconstriction after exposure to certain types of irritant chemicals) in that individual and a history of exposure to irritants and acidic vapors in air emissions from the CSI facility. In his May 18 letter to the EEB, Dr. Stopford related the following: "I am concerned that this incinerator may be exposing individuals in surrounding areas to unacceptably high levels of respiratory irritants, from time to time....I think that the best way to determine whether or not this is a problem is to do a cross-sectional clinical epidemiologic study of the population downwind of the incinerator as well as a controlled population somewhere else in the county."

On June 15, 1987, at the request of the county health director, EEB staff attended a scheduled meeting of the Caldwell County Commissioners to apprise them of the ongoing in-depth investigation of health-related issues related to CSI.

Because the EEB (and the county health director) still had not received the requested information from Dr. Guerra, a meeting was arranged with the Caldwell County Medical Society to find out if other physicians were seeing patients similarly affected and if they had concerns similar to those of Dr. Guerra. This meeting occurred on July 8, 1987. During that meeting and after it, no other physicians (including the physician providing medical monitoring services to CSI employees) reported seeing patients in their practices with illnesses

which they thought might be attributable to environmental or occupational exposure to toxic chemicals associated with CSI. Dr. Guerra was at this meeting.

The EEB took the opportunity at that meeting to brief the medical society on the results of initial environmental sampling near the facility and the proposed investigation of health complaints potentially related to the facility.

After the July 9, 1987 meeting with the medical society, Dr. Guerra sent the EEB copies of his records which included brief clinical evaluations and impressions on 15 patients. The majority of these patients had a diagnosis of fume-induced reactive airways disease. Several of these patients were eventually evaluated by physicians at DUMC. Their findings are discussed later in this report.

Over a period of 20 months, from October 1986 to April 1988, the EEB conducted an extensive evaluation of the potential health risks associated with the operation of hazardous waste incinerators in general and the CSI incinerator in particular. Correspondence, analytical results, summary reports, and risk assessments related to specific investigations have been made available to state and federal agencies, interested members of the public, representatives of CSI, and the media. The Caldwell County Health Department served as the major point of distribution for these documents to the public, representatives of CSI, and the media. Copies of pertinent information and correspondence related to the EEB's investigation of the CSI issue (with the exception of confidential medical information) accompany this executive summary.

The EEB's evaluation included the following components:

- (1) A review of the scientific literature on state-of-the-art incinerator technology and potential adverse health effects associated with the technology.

FINDINGS: An EEB report (dated July 29, 1987) details pertinent issues related to hazardous waste incineration in general and the CSI incinerator in particular. The EEB concluded early in its investigation that operation of the

CSI incinerator could be associated (and in some cases was plausibly associated) with some of the reported adverse health effects, particularly the respiratory ones. One should bear in mind that the CSI incinerator operated for most of its history without any pollution control equipment, and that the air quality regulations in effect during its operation were extremely limited and were, for the most part, essentially those required by federal regulations under the Clean Air Act. (There were no state air pollution regulations related to acceptable ambient levels for specific pollutants during the period of CSI's operation). The EEB received several reports of visible emissions which would support incomplete destruction of organics and formation of products of incomplete combustion. The EEB concluded from its review of the literature that the facility and its operation were not representative of state-of-the-art hazardous waste incineration capability.

- (2) Comprehensive sampling of environmental media (surface water, groundwater, and soil) downwind from the incinerator. Analyses were conducted for both inorganic and organic chemicals. Control samples were taken and analyzed where appropriate and analytical results were subjected to statistical testing. Where real or potential routes of exposure to humans existed, state-of-the-art risk assessments for specific concentrations of contaminants detected were provided.

FINDINGS: The EEB found evidence of offsite contamination of the environment with organic chemicals; the evidence supporting offsite contamination with inorganics (heavy metals) was less clear. However, it was determined that the concentrations of inorganics (heavy metals) and organics detected were not sufficient to pose a significant short-term or long-term risk to public health. This conclusion was based on the known toxicology of these substances, epidemiologic studies of human exposure, evaluation of potential exposure pathways, and application of state-of-the-art risk assessment methodologies.

In May, July, and September of 1987, the EEB collected 43 offsite soil samples downwind from the facility. These samples were obtained from: (1) areas determined by modeling to fall within the location of maximum deposition of the incinerator's air emission plume, (2) areas containing physical evidence

of vegetation damage, and (3) areas near residences of individuals who reported experiencing adverse respiratory health effects from the incinerator's air emissions. Thirty-four of these samples were obtained from locations on the Haas dairy farm, which is immediately adjacent to the CSI facility and which fell within the modeled area of maximum deposition. Seven additional samples were obtained from the property of Max Roberts, an individual who lived approximately five miles downwind and who had reported, among other problems, respiratory illness associated with inhaling fumes emanating from CSI. During this same time frame, the EEB obtained sixteen background soil samples for use as controls. Six of these samples were obtained from a local farm (Hatley) located approximately one mile from CSI. Because the concentrations of metals often vary with soil type, ten other control (background) samples were taken in another part of the county from a location identified as having the same soil type (Pacolet/Cecil) as that found on the Haas property.

The concentrations of potentially toxic metals detected in soil samples obtained from downwind locations were comparable to those obtained from both local and more distant upwind control samples. The concentrations of potentially toxic metals in all the samples were well within background ranges reported in the literature. It should be noted that any concentrations of cadmium and mercury in soil samples obtained near the facility were below detection limits of 10 ppm and 0.1 ppm respectively. The mean lead concentrations in soil samples taken from the sites downwind near the facility (Haas and Roberts samples) were below the mean for the control samples used to determine background levels. The mean concentrations for chromium and arsenic in soil samples taken from the sites downwind near the facility were higher than those of local control samples, but the means for both sets of samples were below background levels reported in the literature. The EEB determined that these increased concentrations could be due to either variation in natural background levels, or due to airborne deposition, or a combination of both. Regardless of their etiology, the EEB determined that concentrations of all metals detected in all soil samples taken from locations near the incinerator, as well as those detected in soil samples taken from control locations, were well below concentrations associated with posing any known risk to the health of farm animals or humans. The basis for this determination is discussed later in this section.

It should be noted that the results of analyses for heavy metals represented total soil concentrations for the specific metals and not extractable or bioavailable concentrations which are used for hazardous waste regulatory purposes under the Resource Conservation and Recovery Act (RCRA). The total concentrations for specific metals in the soil samples were so low that it was deemed unnecessary to perform extraction analyses, which would render results well below those deemed significant under the RCRA.

The EEB sampled surface and groundwater sources offsite on the Haas property on four (4) separate occasions over a four-month period from July 2, 1987 to November 3, 1987. Minute, although not insignificant, concentrations of volatile chlorinated organic chemicals (primarily 1,2 dichloroethane and chloroform) were detected in some potable or potentially potable water supplies (groundwater and surface water) located on the Haas property. The detected concentrations of 1,2 dichloroethane in all samples, including the Haas drinking water well, were below 5 ug/l (ppb), the EPA established MCL for drinking water. The maximum concentration of chloroform detected, 17 ug/l (found in the Haas drinking water well), was well below the average (then year-to-date) concentration of 60 ug/l for chloroform detected in the Lenoir public water supply. (Chloroform is one of several chlorinated organics known as trihalomethanes (THMs) which may be present in drinking water as a by-product of chlorination.) In addition to 1,2 dichloroethane and chloroform, traces of several other chlorinated volatile organics (1,1 dichloroethane, 1,1 dichloroethene, 1,2 dichloroethene, and 1,1,1 trichloroethane) were detected in the water samples taken from the Haas property. Estimates of carcinogenic risk attributable to the two organic contaminants (1,2 dichloroethane and chloroform) detected in the Haas' wellwater, based on lifetime consumption, were in the range of 5×10^{-5} for these contaminants. Estimates of carcinogenic risk for comparable THMs detected in the Lenoir public water supply during the then current year were approximately twice as great, in the range of 1×10^{-4} .

The EEB also analyzed the offsite (Haas) water samples for inorganics. Routine screens for heavy metals (As, Cd, Cr, Hg, Pb) and radionuclides (gross alpha and beta measurements) were conducted. Concentrations of heavy metals and measurements of radioactivity were well below the maximum concentrations

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allowed by federal drinking water standards. In fact, the results of all measurements for heavy metals were below detection limits.

The EEB sampled four other local private wells offsite near the CSI facility and found no evidence of contamination with volatile chlorinated organics.

Based on the results of surface and groundwater sampling on the Haas property, on November 23, 1987, the EEB requested that the SHWMB conduct an investigation to determine the source of the contamination. A copy of this request was sent to the Groundwater Section in DNRCD. (On June 22, 1988, the EEB received correspondence from the SWMS (SHWMB) that sampling of two abandoned wells on the CSI site had revealed onsite groundwater contamination with multiple volatile organics, qualitatively the same or similar to those detected in water samples obtained offsite, as well as with other organic hydrocarbons not detected in water samples obtained offsite. The report stated that no direct source for the onsite contamination had been identified.) On March 24, 1988, the SWMS sampled an underground fuel tank and identified the presence of 1,1,1 trichloroethane, toluene, xylenes, ethyl benzene and a variety of substituted benzenes and hydrocarbons. While all of these are constituents of gasoline, it has been stated that this tank was used for underground storage of liquid hazardous waste.

In September 1987, the U.S. EPA collected six soil samples offsite (four of which were taken from the same farm (Haas) downwind from the facility sampled by EEB staff). According to the EPA report, the (EPA) soil samples were collected from locations that would have intercepted spills and/or runoff from the CSI site.

On October 9, 1987, the SHWMB was verbally notified by staff at EPA that EPA was preparing to issue a 7003 Imminent Hazard Order against CSI based on the results of their September 1987 offsite sampling. (EPA may issue a 7003 Imminent Hazard Order on the basis of an imminent and substantial endangerment to health or the environment.) This information was shared in writing with the Secretary of DHR on October 14, 1987. (EPA had requested that this information remain confidential because it involved pending enforcement action.) Sometime in November 1987, this information was verbally transmitted to the EEB by the SHWMB. The EEB had not found any offsite contamination which, in its opinion,

would justify issuing such an order (on the basis of an imminent hazard to human health) and had informed the local health director that results of environmental sampling were insufficient to declare the CSI facility, or offsite areas, an "imminent health hazard" based on its North Carolina legal definition and interpretation. On January 19, 1988, the EEB wrote a letter to EPA asking that it share any information which would support issuing a 7003 Imminent Hazard Order on the basis of an "imminent hazard to human health." After repeated verbal and written attempts to obtain from EPA the analytical results of their September 1987 sampling, the EEB received them on April 21, 1988, accompanying a letter from EPA dated April 19, 1988.

Based on the data that the EEB received from EPA, very low concentrations (estimated 1 ug/l to 31 ug/l) of volatile organics (similar to those detected in the water samples obtained by the EEB) were detected in offsite surface water and groundwater sources sampled by EPA. The locations of these sources were similar to those sampled by the EEB. The maximum concentrations for 1,2 dichloroethane found in two spring samples (7.7 ug/l and 8.1 ug/l) were only slightly above the EPA established MCL of 5 ug/l. The highest concentration of a volatile organic detected in the EPA water samples was 31 ug/l for 1,1,1 trichloroethane and was detected in a spring sample. 1,1,1 trichloroethane (methyl chloroform) is a commonly used solvent and aerosol propellant. It is relatively non-toxic to humans compared to many other solvents, but is responsible for approximately 10% of atmospheric ozone depletion. According to a recent report, a MCL of 200 ug/l (ppb) has been proposed for 1,1,1 trichloroethane. No chloroform was detected in any of the EPA water samples. Four volatile organics were detected in the Haas wellwater sample at concentrations ≤ 1.5 ug/l; these concentrations were below EPA established MCLs. The concentrations of heavy metals in all the water samples were also below established federal drinking water standards.

Total concentrations of metals detected by EPA in offsite soil samples were consistent with those determined by the EEB. Arsenic concentrations were somewhat increased over those detected by the EEB but again were well below background levels reported in literature. The EPA results for metals concentrations were summarized as follows: "Metal concentrations were generally low for all samples." These concentrations for specific metals were total concentrations; due to low total concentrations, no acid extractions were performed.

Substantial concentrations of some common volatile organic chemicals were detected by EPA in only one of four offsite soil samples. This sample was a composite sample obtained from a depth of 2 to 6 feet, "collected from a point approximately 50 feet from the facility fence behind an old sump." The estimated concentrations of organics detected were as follows: xylene (m or p) - 2700 ug/kg (2.7 ppm), xylene(o) - 1500 ug/kg (1.5 ppm), trimethylbenzene - 200 ug/kg (0.2 ppm), propylbenzene - 200 ug/kg (0.2 ppm), 1,2 dichlorobenzene - 70 ug/kg (0.07 ppm), and oxy-bis-benzene - 8000 ug/kg (8.0 ppm). Although one cannot compare soil concentrations of organics to acceptable ambient air concentrations, OSHA standards for exposure in the workplace can be used to illustrate the relatively low levels of these chemicals found in the soil samples: xylene - permissible exposure limit-time weighted average (PEL-TWA) 100 ppm, short term exposure limit (STEL) 150 ppm; trimethylbenzene - PEL-TWA 25 ppm; propylbenzene - no PEL-TWA established; dichlorobenzene - (PEL-TWA) 75 ppm for p-dichlorobenzene and a ceiling of 50 ppm for o-dichlorobenzene; oxy-bis-benzene (phenyl ether or diphenyl ether) PEL-TWA 1 ppm. Although oxy-bis-benzene has a relatively low PEL, compared to concentrations found in soil, according to Kerwin & Sandmeyer, "experience in manufacturing, handling, and selling this material over many years has indicated that the material does not present an appreciable hazard to health as ordinarily used...The vapor toxicity of diphenyl ether has not been determined directly; however, some experiments on materials that consisted largely of this compound have indicated that vapor concentrations that can occur at ordinary room temperatures present no hazard of systemic injury. It should be noted that such concentrations are quite low because of the lower vapor pressure of the material, and furthermore, that such concentrations have an odor which may be disagreeable."

The EEB, after reviewing the EPA report, concluded that these concentrations of organics detected in the single soil sample obtained near the incinerator site at a depth of 2 to 6 feet did not pose an imminent hazard to public health. The concentrations of these organics in soil (at a depth of 2 to 6 feet) cannot be translated to ambient air concentrations for the purpose of assessing potential exposure via inhalation. (Even if they could be compared, most are well below established occupational exposure standards.) Furthermore, no identifiable routes of exposure were present at that time.

On June 15, EES staff visited CSI, and at the request of local residents, collected five soil samples from the Haas property in areas of alleged offsite dumping. Upon learning of an impending SBI investigation, these samples were turned over to the SBI as part of their investigation. The analytical results for these samples indicated the presence of low concentrations of xylenes (total xylenes ≤ 1.7 ppm) and low concentrations of dichlorodifluoromethane (≤ 6.6 ppm). These low concentrations were not indicative of any significant risk to human health. Again, although one cannot compare soil concentrations to acceptable ambient air concentrations, OSHA standards for exposure in the workplace can be used to illustrate the relatively low levels of these chemicals found in the soil samples. The OSHA standard for dichlorodifluoromethane (Freon 12) is 1000 ppm (PEL-TWA). The OSHA standard for xylene is 100 ppm (PEL-TWA); 150 ppm (STEL). One additional set of offsite soil samples (Haas property) was collected on August 3, 1987 by the SHWMB and analyzed for metals. The results were in the range of previously reported background levels.

On June 17, 1987, the SHWMB requested the assistance of the Attorney General's Office and the SBI in conducting an investigation into complaints and allegations concerning illegal disposal of hazardous waste at and beyond the site operated by CSI. Accompanying the SHWMB request were results from offsite sampling for organics and inorganics conducted on May 13 and 14 1987 by the SHWMB indicating the presence of low concentrations of several organic chemicals including 1,2,4-trichlorobenzene (0.77 ppm), naphthalene (1.8 ppm), bis(2 ethylhexylphthalate) (5.2 ppm), toluene (15.3 ppm), ethyl benzene (10.7 ppm), xylenes-total (97 ppm). The EES determined that these concentrations of organics detected in soil offsite did not present an imminent risk to human health. As a simple comparison for one of these, naphthalene moth balls are 100% (one million parts per million) naphthalene. Again, although one cannot make direct comparisons between soil concentrations and acceptable ambient air concentrations, the PEL-TWA for toluene and xylene are each 100 ppm and the STEL for each is 150 ppm; the PEL-TWA for naphthalene is 10 ppm and the STEL is 15 ppm; the ceiling limit for exposure to 1,2,4 trichlorobenzene is 5 ppm; the PEL-TWA for ethylbenzene is 100 ppm and the STEL is 125 ppm. There is no established PEL for bis(2 ethylhexylphthalate).

The results of inorganic analysis are as follows:
50 ppm, 25 ppm, 20 ppm, 10 ppm, 20 ppm, 10 ppm, 2.5 ppm (si), background, <0.25 ppm.

The results of inorganic analyses in the five soil samples were chromium: 50 ppm, 25 ppm, 20 ppm, 10 ppm (single background sample 59 ppm); lead: 124 ppm, 20 ppm, 10 ppm, 15 ppm (single background sample 15 ppm); cadmium: all <2.5 ppm (single background sample <2.5 ppm); mercury: all <0.1 ppm (single background sample 0.1 ppm); selenium: all <0.25 ppm (single background sample <0.25 ppm); arsenic: 14 ppm, 20 ppm, 7 ppm, 16 ppm (single background sample 1.5 ppm); barium: 65 ppm, 35 ppm, 20 ppm, 20 ppm (single background sample 35 ppm). These concentrations represented total metals; no acid extractions were done. These results were not markedly different than those obtained by the EEB.

A single background sample limits interpretation of these values. However, when these values for metals are compared to those obtained from other background soil samples collected by the EEB, certain individual values (e.g., lead 124 ppm) appear to be outliers and would strongly suggest contamination. The levels of contamination are nevertheless minor. For example, the Agency for Toxic Substances and Disease Registry (ATSDR) currently recommends 1000 ppm as the action level for clean-up of lead-contaminated soil in residential areas. The EES recommends and utilizes an action level of 500 ppm in its Childhood Lead Poisoning Prevention Program.

To put the 124 ppm level in additional perspective, the EES has evaluated numerous backyard automobile battery reclamation sites in North Carolina. These sites often yield soil lead concentrations in the range of several thousand parts per million. One site near Asheboro yielded soil concentrations over 100,000 ppm. Another residence near Rockwell had total lead concentrations of 6120 ppm (3.8 ppm extractable). These sites clearly represented health hazards to children playing in their yards.

In 1983, Byrd published a report in Environmental Science and Technology detailing the concentrations of lead from roadside soil along I-20 in Louisiana. Concentrations of lead in samples obtained in 1973 and 1974 ranged up to several thousand ppm; concentrations in samples obtained in 1979 (well after the introduction and use of lead-free gasoline were an order of magnitude less-in the hundreds of ppm).

A 1982 EPA document stated at the time that "25% of the nations sewage sludge is presently utilized in land application projects and most of these

involve application to cropland. In 1981, the U.S. EPA, U.S. FDA, and U.S. Department of Agriculture recommended that sludges applied to cropland contain less than 25 ppm cadmium and less than 1000 ppm lead. A more recent EPA document (February 1989) presented data on heavy metals present in municipal wastewater sludge:

	<u>All Concentrations in mg/kg (ppm)</u>		
	Median	90th percentile	98th percentile
As	4.4	16.4	36.4
Cd	11.2	101.7	615.1
Cr	248.2	1190.6	3063.0
Pb	265.7	821.9	1622.8
Hg	1.74	7.2	17.0

Up until last year, EPA allowed cumulative loading of lead from 500 to 2000 pounds per acre of cropland depending on the cation exchange rates in the soil. Last year, EPA proposed to lower the cumulative loading rate to 125 pounds per acre.

A report by the CDC (Center for Environmental Health), published in 1987 in the Bulletin of Environmental Contamination and Toxicology and entitled "Arsenic Exposure in Children Living Near a Former Copper Smelter", puts the soil concentrations for arsenic in perspective. The article presents environmental soil sampling results for residential sites near the Anaconda copper smelter in Montana. In one community (Mill Creek) downwind from the smelter, mean total soil arsenic concentrations averaged 398 ppm (range 203-693) in a study of five (residential) yards and 715 ppm (range 150-1950) in a study of 37 yards, compared to mean concentrations of 44 ppm (range 19-146) in soil obtained from six yards in the control community of Livingston. Additional residential soil sampling carried out in the town of Anaconda yielded arsenic concentrations averaging 100 ppm or greater. Seasonal biological monitoring of children (urine analyses for arsenic) was carried out, and the results suggested that mean soil arsenic concentrations around 100 ppm are not associated with excess exposure to arsenic in young children, the most susceptible target population.

Barium is relatively abundant in nature, being found in both plant and animal tissue. Its average concentration in the earth's crust is 400 ppm. As mentioned later in this report, plants accumulate barium from the soil. As an example, Brazil nuts have very high concentrations in the range of 3000-4000 ppm.

The average concentration of chromium in the earth's crust is 200 ppm. The level of chromium in soils varies greatly with the composition of the parent rock from which the soils are formed. Chromium concentrations in soils have been reported to range from 5 to 1500 mg/kg (Carey 1982). In a study (Beyer and Cromartie) utilizing different kinds of soils from 20 sites in Maryland, Pennsylvania, and Virginia, the chromium concentration was reported to range from 4.9 to 71 mg/kg (ppm).

To put the soil chromium concentrations in perspective, the EEB investigated offsite contamination near a chrome plating operation in Charlotte, North Carolina, which revealed soil concentrations in the range of 175 ppm. Trivalent chromium is an essential trace element; hexavalent chromium is a known human carcinogen. The EEB determined that the very low soil concentrations of chromium detected did not represent any significant health risk, especially because chromium is poorly absorbed across the gut. However, the EEB did suggest that additional modeling be carried out to evaluate the potential for significant inhalation exposure from incinerator emissions.

Because young children may be exposed to lead, arsenic, cadmium, barium, and other heavy metals in soil through hand-to-mouth ingestion, proper hazard evaluation of heavy metals contamination in soil is essential. The EES believes that there are more than sufficient scientific data to conclude that the concentrations of metals detected in offsite soils (regardless of their origin) did not (and still do not) pose any measurable risk to human health, even if plausible exposure pathways to neighboring populations existed.

In March 1990, the EES received from the Air Quality Section a document, appearing on Dr. Guerra's letterhead and apparently authored by him, which references a "classified" EPA document dated November 1989 discussing, among other issues, soil gas concentrations in excess of OSHA limits. The EES has just received and is reviewing a copy of this now declassified document. The EES feels that it should be made very clear that it is inappropriate to make

risk assessment statements based on comparisons of soil gas concentrations of volatile organics measured two or more feet underground by comparing them to OSHA standards for workers or to acceptable ambient levels derived for the general population. Because this EPA study currently is being quoted in the media, a critical review of it follows:

From August 1-12, 1988, PRC Environmental Management Company, under contract to EPA, conducted soil, soil gas, and water sampling to verify and characterize onsite and offsite environmental contamination at CSI. EPA and SBI staff were present during parts of the sampling period. The sampling included two phases, the first involving soil gas sampling on a grid pattern to identify general contaminant patterns; the second focused on soil and soil gas sampling of hot spots and alleged spill areas. There are several important findings in this report:

- 1) Volatile organic compounds (VOCs) were detected in soil gas measurements over much of the CSI site. Soil contaminated with VOCs and semivolatile organic compounds was noted over a smaller area. Three discrete areas of elevated soil gas contaminations were delineated; two of these areas also exhibited elevated soil contamination.
- 2) The largest area in which most of the VOCs were identified was adjacent to the storage and bulking operations at CSI. The PRC report suggested that spillage of waste either as discrete events or improper handling over a long period of time may have been responsible.
- 3) To a lesser extent, VOC contaminants were identified in an alleged spill area on the Haas property located approximately 75 feet west of the fence line delineating the CSI site. The PRC report states that contamination on the Haas property appears to be concentrated in a single area.
- 4) Very low levels of volatile chlorinated organics (qualitatively the same as those detected by the EEB and EPA) were detected in all of the spring water samples. The highest concentration for 1,2 dichloroethane was 15 ug/l (ppb); for 1,1 dichloroethane was 5 ug/l (ppb); for 1,1 dichloroethene was 8 ug/l (ppb); and for 1,1,1 trichloroethane was 46 ug/l (ppb). These concentrations are so similar to those described earlier in this summary that additional discussion is not required. Even though the concentrations of some of the VOCs are slightly above MCLs, they are insufficient to constitute an imminent health hazard.

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5) Concentrations of RCRA toxic metals in all the spring water samples were below detection limits except for barium which was detected at concentrations well below the established drinking water standard of 1.0 ppm.

6) With the exception of one onsite sample (Barium 1520 ppm), all other measurements for heavy metals both onsite and offsite were low. For example, the maximum concentrations detected onsite and offsite respectively were: As 16 ppm, 26 ppm; Ba 268 ppm, 55 ppm; Cd ND (Not detected), ND; Cr 77 ppm, 53 ppm; Pb 71 ppm, 26 ppm.

The PRC survey contains one rather outstanding design error. Only one offsite sample was taken to characterize background concentrations of metals in soil. Maximum concentrations of individual toxic metals detected in all other samples were then compared to the results of individual metals in the one background sample by dividing the result obtained in the background sample into the highest concentration detected in other samples. Multiple background samples should have been obtained to determine the mean and range for each individual metal because background concentrations for metals in soil can vary substantially from sample to sample. As an example, in the CDC study of arsenic contamination near the Anaconda copper smelter in Montana, background samples taken near the control community of Livingston were analyzed for arsenic. The background concentrations ranged from 19-146 ppm; these vary by almost a factor of 8. Utilizing background concentrations obtained from soil samples obtained by the EEB and the EPA as a comparison, the soil samples obtained from the Haas property appear to have slightly elevated levels of chromium, arsenic and barium. However, all of these concentrations on the Haas property are similar to those determined by the EEB and/or EPA, and are well below background concentrations reported in the literature. The EEB has stated previously that a component of the offsite metals concentrations may have been due to contamination from CSI air emissions. However, the concentrations present are well below concentrations indicative of a health hazard. The EES also believes that none of the metals concentrations detected offsite would approach an action level for clean-up under RCRA.

One onsite soil sample did have a relatively high concentration of barium (1520 ppm) and there were several other onsite areas where lesser concentrations (≤ 268 ppm) above background were found. The EES does not know if EPA has a current action level for barium, but suggests that either an EP toxicity test be performed or an effort be made to identify the specific barium compound responsible for the contamination. Insoluble barium compounds (e.g., barium sulfate used as a radiopaque aid in x-ray diagnosis in barium swallows and barium enemas) are essentially non-toxic due to minimal gastrointestinal absorption; some soluble barium compounds may be highly toxic upon ingestion.

- 7) All concentrations for volatile and semivolatile organics detected in soil were relatively low. Maximum concentrations were: xylenes 71 ppm, toluene 24 ppm, ethyl benzene 12 ppm, acetone 9.2 ppm, MEK 2 ppm, styrene 27 ppm, MIBK 0.49 ppm, tetrachloroethene 2 ppm, 1,1,1 trichloroethane 0.5 ppm, 1,2 dichloroethane 0.20 ppm, methylene chloride 0.64 ppm, 1,1,2 trichloroethane 0.002 ppm; naphthalene 49 ppm, bis-(ethylhexyl)phthalate 66 ppm, 2-chloronaphthalene 5 ppm, 2-methylnaphthalene 7.5 ppm, phenol 42 ppm, 2-methylphenol 54 ppm, 2,4-dimethylphenol 7.2 ppm.
- 8) A second major problem with the PRC-EPA report is that the raw data from sampling results do not correlate with tabulated data which are used to draw conclusions. Specifically, Table 11-Major Chemical Contaminants and Regulatory Thresholds at CSI, appears to have been erroneously prepared based on raw data contained in the report. Therefore, statements made in the conclusion of the report are erroneous. For example, the PRC report states "the soil gas samples show contaminant concentrations well in excess of OSHA limits and, therefore, well in excess of population exposure limits which are lower than OSHA. While surface emissions would be diluted by air, these data suggest potential hazards for those closest to such emissions..." The raw data reviewed by the EES indicate that soil gas measurements for volatile hydrocarbons and ketones do not exceed existing or proposed OSHA standards. Furthermore, the soil gas concentrations for only two of the volatile chlorinated hydrocarbons (1,2 dichloroethane and 1,1 dichloroethane) exceed OSHA standards. The EES believes that it would be very unlikely for these volatile organics to exceed OSHA standards at

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the soil surface and virtually impossible for them to exceed OSHA standards in the breathing zone of an individual walking near a contaminated area. The EES suggests that ambient air monitoring near areas of maximum soil gas measurements be conducted to determine if any concentrations of volatile organics can be detected in the ambient air.

The report states that the data are not adequate to perform a quantitative risk assessment but state that they are adequate for an initial risk characterization. The EES believes that PRC should have used more precision in risk characterization statements related to concentrations of chemicals detected in soil, soil gas, and water.

The EES received numerous pieces of information alleging criminal activity related to illegal disposal of hazardous waste offsite. The EES has relied on state regulatory agencies and the U.S. EPA, SBI, and FBI to investigate these allegations. To date the EES has not been apprised of documented illegal offsite disposal.

The EEB recently received a declassified EPA report detailing an October 1988 excavation of an area of the Caldwell County landfill which was alleged to contain illegally disposed waste; analysis revealed the presence of toluene and benzene in low concentrations.

The EES just received the following November 27, 1989 declassified memo from EPA related to potential criminal activity:

"On October 30, 1989, a teleconference call was made to Tom Burleson of the Federal Bureau of Investigation in Charlotte, NC from the Region IV Office with John Lank, Deborah Espy (Office of Regional Counsel) and Robert J. Pulfrey, Environmental Scientist present. The purpose of the conference call was to determine whether sufficient evidence was available to date from the joint effort of the N.C. Bureau of Investigation, F.B.I. and Region IV of the EPA to proceed with an indictment against Caldwell Systems Inc.

Tom Burleson said that in both his opinion and the opinion of the Attorney General in the western district of North Carolina that the evidence was not sound enough for a solid case for several reasons: (1) not being able to pin-point a specific violation to a specific time (2) the poor reliability of the witnesses and (3) the deadline

for the statute of limitations had passed (for some of the alleged illegal disposal acts).

Given this evaluation and with no objection from those present, suggested we (EPA, F.B.I., NC Bureau of Investigation) officially close the Caldwell Systems Inc. investigation. Tom Burleson agreed but added that the case could be reopened should any new information be received. Thus, with the investigation officially closed, all data and evidence previously marked 'Enforcement Confidential' be declassified as such."

On April 17, 1990, Representative Cass Ballenger and several citizens from his district met with EPA to discuss environmental and health concerns related to CSI. As a result of that meeting, EPA requested ATSDR to consult with EPA on the public health threat implications which may be posed to ex-workers, their families, and area residents. ATSDR has communicated to the EES that they have not received copies of any of the investigations performed by it. The EES is in the process of forwarding to ATSDR copies of this summary and supporting documents for their review.

(3) Biological monitoring of a dairy herd (Haas) pastured downwind near the incinerator and a control dairy herd (Hatley) pastured more distant to the incinerator. Scientific articles indicate that low concentrations of metals and products of incomplete combustion may be present in air emissions from incinerators which burn municipal waste, medical waste, or hazardous waste. The purpose behind biological monitoring using a dairy herd downwind from the facility within the fallout plume was to utilize the potential for chronic exposure to toxics via inhalation and ingestion to establish whether or not there was any evidence to support bioaccumulation of metals or dioxins from incinerator emissions. Evidence of bioaccumulation of toxic metals and fat soluble chlorinated organics such as dioxins would provide objective evidence to support concerns about certain potential long-term health risks associated with emissions from the facility.

Lead was selected as an indicator metal for the heavy metals because (1) it bioaccumulates, (2) a valid and sensitive methodology for analyzing lead in

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blood exists (this does not exist for the other metals such as cadmium, mercury, barium, chromium, or arsenic), and (3) RCRA reports indicated that substantial amounts of lead-contaminated wastes were burned. (As an example, 624,440 pounds of lead-contaminated tank bottoms were burned in 1984 compared to 2200 pounds of mercury-contaminated wastewater, 19,360 pounds of barium-contaminated wastewater, 74,360 pounds of chromium-contaminated wastewater, and 37,840 pounds of cadmium-contaminated wastewater.)

Dioxins, and specifically 2,3,7,8-TCDD, were chosen as indicator organics because (1) dioxins are products of incomplete combustion and their formation has been associated with many types of incineration processes, (2) in certain animal models, 2,3,7,8-TCDD, the most potent dioxin congener, has been demonstrated to cause malignancy, reproductive toxicity, immunotoxicity, etc., at remarkably low concentrations, (3) dioxins bioaccumulate, (4) a valid and sensitive analytical method for detecting dioxins in blood exists, and (5) they are the class chlorinated organic chemicals which seem to receive the greatest media coverage and seem to generate the most concern with the general public.

FINDINGS: In May 1987, EEB staff obtained individual blood samples from cattle in exposed (Haas) and control (Hatley) dairy herds. Individual cattle sampled had been grazing on their respective farms for more than three years, a period of time more than sufficient for bioaccumulation of metals and dioxins through inhalation and ingestion exposure pathways. The management and the feeding of the two herds were very similar with one person managing both farms. Results of biological monitoring of the Haas dairy cattle (exposed) did not reveal evidence of bioaccumulation of lead or chlorinated dioxins and furans.

Blood lead levels were similar (the difference between the means for both herds was not statistically significant at the 0.05 level) in the exposed and control herds, and all individual measurements were below "normal" blood lead levels reported in the literature for cattle. The EEB also collected blood samples from several members of the Haas family for erythrocyte protoporphyrin and/or blood lead analysis. All results were within normal limits.

The EPA Environmental Monitoring Systems Laboratory performed the dioxin/furan analyses for the EEB. No dioxins or furans were detected in blood sera obtained from individual cows from either herd. The limits of detection for the various dioxins and furans were < 10 parts per trillion (ppt). These limits of detection are incredibly sensitive; to put them in perspective, one part per trillion is approximately equivalent to one inch in sixteen million miles.

Certain local citizens have criticized the methodology for dioxin determination, stating that analysis for dioxin should have been conducted on body fat samples or milk samples (rather than blood sera) since dioxin concentrates in fatty tissue. They have also implied that the cattle should have been fasted before sampling the blood.

It is well known that certain fat soluble organic chemicals do bioaccumulate in fatty tissue. However, there are inherent difficulties associated with obtaining body fat samples and milk fat samples for dioxin analysis. In 1986, the Centers for Disease Control (Center for Environmental Health) developed a valid method for measuring dioxin (2,3,7,8-TCDD) in human serum (based on lipid weight) and demonstrated that there is a very high correlation ($r=.98$) between concentrations of dioxin in blood serum and fat tissue. Although levels of these chemicals are higher in fat than in blood, there is an equilibrium established, analogous to calcium (or lead) in bone and calcium (or lead) in blood. Certain physiological states such as pregnancy, starvation, and stress can result in mobilization of fat soluble chemicals from fatty tissue to blood. However, it was neither necessary nor appropriate to impregnate, starve, or stress Mr. Haas' cattle in order to analyze their blood for dioxin/furan content.

The steady state equilibrium ratio of dioxins and furans in human blood compared to fat is approximately 1 : 80. Although the ratio is not exactly known for cattle, Dr. Renate Kimbrough, an internationally-recognized expert on dioxins, indicated to the EEB at the time that 1 : 100 would be a reasonable estimate for cattle. Therefore, if no dioxins/furans were detected in the cattle's blood and the limits of detection ranged from 0.1 ppt to 5 ppt, then the maximum fat concentrations of dioxins and furans (based on the above ratio of 1 : 100) would range between 10 ppt to 500 ppt or 0.01 ppb to 0.5 ppb. Based

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on extensive toxicity testing of 2,3,7,8-TCDD, there is no evidence (that the EEB is aware of) that such levels in fat, if present, are biologically significant.

It should be pointed out that 20 ppt is considered to be the upper limit for dioxin (2,3,7,8-TCDD) in blood serum (lipid weight) for residents of the United States with no known exposure to TCDD. This concentration is approximately between 4 to 200 times greater than the limits of detection for the various dioxins in the blood sera of Mr. Haas' cattle.

On January 27, 1988, the North Carolina Department of Agriculture (NCDA) collected a composite milk sample from the Haas' dairy herd. On analysis, no cadmium, PCBs, or any of approximately fifty chlorinated organic pesticides were detected in the sample. The limit of detection for cadmium was 0.1 ppm, and for PCB (Arachlor) was 0.05 ppm. The limits for the other chlorinated organics ranged from as low as 0.001 ppm to as high as 10 ppm. The limits of detection for most were $\leq .05$ ppm.

In addition to this investigation by the EEB, faculty at the NCSU College of Veterinary Medicine (who are credentialed in veterinary toxicology) conducted an evaluation of illnesses, deaths, and reproductive problems reported in the Haas dairy herd pastured near the facility. In their report dated November 23, 1987, poor nutrition, poor animal husbandry, and lack of veterinary services were cited as the most plausible reasons for the problems. Potential toxic etiologies were explored and, other than naturally-occurring toxic plants (which were numerous and showed evidence of consumption), no valid reason to implicate a toxic etiology was found. One cow which died was necropsied and found to have lymphosarcoma. Despite assertions that this malignancy was caused by toxics from the incinerator, lymphosarcoma in cattle has been determined to be caused by a specific infectious agent, bovine leukosis virus. Another cow from the Haas herd was slaughtered at a NCDA inspection facility and it passed inspection. The liver from this cow showed focal hemorrhagic necrosis, a non-specific pathological finding which may be caused by infectious agents, plant toxins, veterinary medications, or other chemical exposures. The concentrations of chlorinated organics (chloroform, 1,2 dichloroethane, and 1,1,1 trichloroethane) detected in the Haas wellwater (reportedly the major water source from which the cattle regularly drank)

were deemed insufficient by the veterinary toxicologist to cause death and reproductive problems in the cattle. In addition, centrilobular necrosis of the liver and fatty degeneration of the liver, kidneys, and heart - findings associated with toxic exposure to chloroform and some other chlorinated organics - were not present in the case submitted for histopathologic examination.

(4) Review of vegetation studies near the incinerator conducted by NRCD.

FINDINGS: The EEB reviewed copies of NRCD reports of vegetation damage near the facility, analytical results for passive collection of chloride, and reports of metals (cadmium, chromium, lead, and barium) and dioxins extracted from particulates on leaves. (The analysis of dioxins in particulates was not an NRCD report.) The EEB concluded that past reports citing evidence of vegetation damage downwind from the facility were credible and that such vegetation damage was plausible.

NRCD vegetation reports suggested that the visible vegetation damage (which was typical of, but more severe than, that seen around other industrial facilities) was characteristic of damage caused by hydrogen chloride (HCl) deposition. The EEB's interpretation of the sampling and analyses for chloride was limited by undocumented analytical methodology and non-utilization of local controls. Results generally showed increased concentrations of chlorides in areas of vegetation damage. However, nearly equally high concentrations were found a considerable distance from the delineated zone of vegetation damage. Utilization of additional local controls would have enhanced interpretation of these results.

The concentrations of metals extracted from particulates taken from one set of leaf samples obtained near the facility were similar to those extracted from particulates taken from three sets of leaf samples taken from three control sites, two within the same county, and one outside it. These analyses for metals in (on) particulates suffered from many limitations. Only one sample of particulates was obtained from leaves downwind from the facility. Because this sample was taken only three (3) yards from the road, the source of some metals present in (on) the particulates could have been due partially to emissions

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excretion for cadmium, and there is significant potential for contamination. For example, sidestream cigarette smoke contains 0.4 to 0.7 ug cadmium per cigarette. The issue of hair analysis for metals is discussed in much more detail in supporting documents accompanying this report. It should be pointed out that no cadmium has been detected offsite in any of the soil samples collected by the EEB or EPA. In addition, ALL in children has not been associated with exposure to cadmium.

On May 28, 1987, Dr. Guerra reported by phone to the EEB one case of multiple congenital anomalies (multiple birth defects). The mother of the infant was reportedly exposed during her pregnancy to vapors from organic chemicals on her husband's work clothes. While the EES agrees that it has been well established that work clothes worn or brought home can provide a source of household exposure for asbestos, heavy metals, and organic chemicals, a single case of birth defects is insufficient to draw a causal association in this instance.

The EEB received no information from local physicians which would raise concerns about excess rates of type/site specific malignancies in residents near the facility. Although the CSI facility had not been in operation long enough to satisfy adequate latency periods for most malignancies (the CSI facility had been burning hazardous waste for approximately 10 years), the EEB conducted a 15-year review (1971-1985) of cancer mortality rates for Caldwell County. Comparison of these rates to those of surrounding counties and the State revealed no significant excesses in the Caldwell County population. In addition, no excess rates were evident from a similar analysis of cancer incidence data for 1987, the first year in which county-specific incidence data have become available from the newly established statewide population-based cancer incidence registry.

Use of cancer mortality data have limited usefulness in evaluating cancer incidence due to the fact that, on the average, 50% of incident cancer cases are cured and therefore are never represented in the cancer mortality statistics. In addition, local excesses of cancer could be masked by county-wide statistics. Cancer mortality statistics can be useful in detecting excesses of rare malignancies, particularly those that have a high fatality rate. Although 15-year mortality data and incidence data from a single year

are of limited value, no statistically significant excesses in type/site-specific malignancies (including those with short latency periods such as acute leukemias) were detected for Caldwell County and no clusters of malignancy were reported in residents living downwind from the facility.

As mentioned earlier, the EEB eventually reviewed medical information and medical records on approximately fifteen residents near the facility after experiencing many months delay in receiving this information from Dr. Guerra. The majority of these residents reported respiratory symptoms and illness associated with periodic exposure to emissions from the facility. Some of these individuals were evaluated more thoroughly at DUMC and were diagnosed as having reactive airways disease, an asthma-like respiratory illness, which plausibly could have been causally associated with (or exacerbated by) exposure to irritant or acidic vapors in air emissions from the CSI incinerator.

In summary, the primary illness diagnosed by Dr. Guerra in residents living proximate and downwind from the facility was reactive airways disease. DUMC physicians to date have evaluated four or five individuals which they feel have developed reactive airways disease as a result of exposure to emissions from CSI. A significant number of individuals in the general population (perhaps 2-3%) have this illness which can be caused by exposure to a number of other irritating chemical substances (e.g., ozone, SO_2 , N_2O , chlorine, bromine, formaldehyde, isocyanates, paint fumes (vinyl latex, and oil-based enamel), antifreeze, concrete floor sealants, fumigating solutions, as well as flour, some wood dusts, and cigarette smoke). Although it is often difficult to attribute the presence of reactive airways disease in a given individual to a specific chemical exposure or source of exposure, clustering of cases proximate and downwind from an incinerator facility operating without adequate pollution control equipment, coupled with historical documentation of asthma-like symptoms occurring after exposure to visible fumes from the facility, would support a causal association in at least some of these individuals. In an attempt to scientifically document a causal association between exposure to emissions from the facility and reactive airways disease, DUMC, in collaboration with the EEB and the Caldwell County Health Department, attempted to conduct an epidemiologic study which would measure the prevalence of reactive airways disease in the population downwind and proximate to the

from motor vehicles. Additional samples near the facility and additional local control samples could have enhanced interpretation of the results. Only one control sample was taken within Caldwell County; the other two controls were taken outside the county at distances of approximately 20 miles and 75 miles respectively from the facility. For the control sample obtained 20 miles from the facility, the results for barium, lead, and chromium were higher than the results for these same metals obtained in the one sample downwind from and near the CSI facility. The concentration of cadmium in this same distant control sample closely approximated that for cadmium in the downwind sample. The rather high concentrations of barium in all of the samples obtained from the control sites compared to the downwind site raise a question about the analytical methodology used. It is known that plants absorb cadmium, barium, and other metals from the soil. Since it was difficult to identify any point sources for emissions of cadmium and barium near the control sites, one wonders whether or not the analytical methodology used to measure concentrations of metals in (on) particulates on leaves was actually measuring that in addition to the concentrations of metals within the leaves.

The one sample of particulates reportedly taken from leaves near the facility by a local investigator and analyzed for dioxins by an independent laboratory generated substantial controversy. The significance of the result, 2.6 ppb, was severely limited by no detailed information on the source of the sample, use of a single sample, and non-utilization of controls.

Dioxins are essentially ubiquitous in the environment. They are found as by-products of many combustion processes. Forest fires are a significant source. Dioxins may be present in emissions from municipal waste incinerators, medical waste incinerators, as well as hazardous waste incinerators. In addition, woodburning fireplaces and woodburning stoves may emit dioxins. According to Dr. Renate Kimbrough, currently Director of Health and Risk Capabilities for EPA, chlorinated additives to leaded gasoline may be transformed to dioxins, and it is estimated that between one-quarter to one-half the dioxins found in particulate materials may originate from automobiles.

Local citizens, for risk assessment purposes, inappropriately compared the analytical result of 2.6 ppb TCDD (presumably 2,3,7,8) to the concentration of

1.0 ppb used as a site-specific action level for clean-up of dioxin-contaminated soil at Times Beach, Missouri. The Missouri clean-up level was based on a complex risk assessment incorporating analytical results from multiple soil samples and specific assumptions related to exposure which were simply not comparable to TCDD contamination of particulates reportedly found on leaves near the CSI facility. In addition, by 1987, new toxicological data on 2,3,7,8-TCDD related to carcinogenic mechanisms provided evidence in support of arguments that some of the risk assessment assumptions used to derive the action level for dioxin-contaminated soil at Times Beach were overly conservative.

Since the Haas dairy herd was chronically exposed to emissions from the CSI facility, the EEB strongly believes that, for the purpose of assessing dioxin/furan risk, the negative results of biological monitoring of the herd for dioxin/furan bioaccumulation should be weighed much more heavily than the positive results for dioxins determined from a single sample of particulates reportedly removed from leaves somewhere near CSI.

- (5) Review of medical records of former employees of CSI who have adverse health effects allegedly related to work at the facility.

FINDINGS: In July 1987, the EEB was verbally notified by the local primary care physician, Dr. Guerra, that two former CSI employees were experiencing neurological/neuropsychiatric illness and chronic dermatitis as a consequence of exposure to organic chemicals at the CSI facility. EEB staff asked Dr. Guerra to provide additional information related to their medical evaluations which would support his diagnoses and rule out other etiologies in the respective differential diagnoses for these conditions. During the same time period, the EEB asked the Occupational Health Branch (OHB) to make a site visit to CSI to evaluate the worksite and work practices. OHB staff made visits (accompanied by DUNC medical staff) on August 6 and 7, 1987 (see section 6).

In September 1987, the Governor requested a summary report on CSI. A summary of health issues was provided by the EEB as a component of that report. At that time, despite requests, the EEB had not received any medical records to verify or characterize the nature of the neurological/neuropsychiatric illness or dermatitis reported in the workers.

The EEB learned in early October that these individuals had been referred to DUMC for further specialty evaluation. On October 6, 1987, the EEB requested copies of their evaluations from physicians at DUMC. They requested that the EEB again try to obtain them from Dr. Guerra. The EEB finally received and reviewed (on October 29, 1987) the medical information and medical records pertaining to the two former employees of CSI.

Review of medical records detailing evaluations conducted at DUMC in July and August 1987, indicated that both individuals were suffering from neurological/neuropsychiatric illness and dermatitis. The work histories of these two individuals at CSI, coupled with the chronology and similarity of their illnesses would tend to support a causal relationship between occupational exposure to organic chemicals at CSI and subsequent neurological impairment. The medical records from DUMC also characterized the rashes in the two individuals as occupational dermatoses probably secondary to chemical exposure. The rashes were not chloracne, a skin condition characteristic of exposure to PCBs and related chemicals.

After the EEB obtained and reviewed these records, a third former employee was evaluated at DUMC and diagnosed as having similar abnormal neurological findings. His neurological symptoms were reported by the same evaluating neurologist to be much less pronounced compared to the debilitating nature of the symptoms experienced by the other two former employees.

Although debilitating neurological illness as a consequence of occupational exposure to organic solvents has been reported numerous times in the scientific literature, there is now some concern that the neurological/neuropsychiatric illness experienced by the former employees may be associated with and characteristic of exposure to certain chemicals present in waste naval torpedo fuel burned at the facility. Such an association would be of significant importance due to an apparently large number of individuals (both within and outside the military) who are potentially exposed to torpedo fuel during its manufacture, use, and disposal.

Recently (in March 1990), the N. C. State Health Director received a letter from the National Institute of Occupational Health and Safety (NIOSH) detailing information they have received on this issue. Based on a limited evaluation conducted by their medical staff, they are recommending that former CSI and

Caldwell Industrial Services (CIS) workers be evaluated for evidence of neurological impairment and other illness which may be associated with exposure to waste torpedo fuel, or other hazardous wastes. The State Health Director and staff in the EES and OHS have supported this recommendation. Due to a lack of resources, we have invited NIOSH staff to direct such an evaluation.

Another former employee who reportedly had limited exposure to chemicals at the facility during her employment was diagnosed (after leaving CSI to work for another hazardous waste firm, GSX) with non-Hodgkins lymphoma (NHL), a malignancy which has been associated with (among other things) exposure to certain groups of organic chemicals, and which, in certain individuals, may have a significant hereditary component. At this time, the evidence linking this individual's malignancy to work at CSI is circumstantial at best.

The Agency for Toxic Substances and Disease Registry (ATSDR) has recently expressed, in phone conversations to the EEB, similar concerns related to the potential toxicity of waste torpedo fuel. They are particularly concerned about certain aspects of its disposal. A cement manufacturing facility in South Carolina reportedly is using it as fuel and, according to a recently received ATSDR report, it possibly is being deep well injected in Texas. On June 7, 1990, the EES received from ATSDR a summary of its findings and concerns related to the CSI facility and surrounding area.

Medical staff at NIOSH and ATSDR have reported that they have not received copies of the various components of the EEB's investigation related to CSI summarized in this report. At their request, copies are being forwarded.

(6) An evaluation of the incinerator facility by industrial hygienists in the Occupational Health Branch (OHB): This evaluation included an evaluation of the general workplace as well as limited monitoring of employees for chemical exposures during various types of work activities.

FINDINGS: The EEB was particularly impressed by descriptions of certain work practices submitted in letters and affidavits by former employees. While there may have been elements of bias or exaggeration in some of the historical reports, the EEB felt at the time that these testimonials were not fabrications and that there was a high probability that unnecessary and potentially harmful

occupational exposures to chemicals may have occurred at the facility. (While some exposures may have occurred as a result of inadequate use of protective clothing and inadequate training and supervision by the management, clearly some of the responsibility for exposure must be shouldered by the employees themselves. For example, reports of wading ankle deep into solvents and reports of hazardous waste sludgeball fights by employees are inexcusable.)

On July 7, 1987, the EEB forwarded copies of affidavits related to work practices at CSI received from Dr. Guerra to the OHB and SHWMB for further evaluation. After receiving verbal reports of neurological illness and dermatitis in workers from Dr. Guerra in July 1987, the EEB (and SHWMB) requested that the OHB visit the facility to evaluate the worksite and work practices of employees.

On August 6 and 7, 1987, an industrial hygienist from the OHB and an occupational medicine resident from DUMC visited CSI. Their report of September 1, 1987 details their findings and makes sixteen specific recommendations related to improving employee protection. Since OHB staff did not have OSHA regulatory authority over CSI, their report was forwarded to the North Carolina Department of Labor (DOL), which had such authority.

(7) Review of medical records of residents living near the facility who have adverse health effects allegedly related to emissions from the facility.

FINDINGS: In February 1987, the EEB received copies of medical records from a resident living downwind from CSI who had a blood chromium determination performed on April 14, 1986. The result was 102.5 mcg/l (normal <5.0 mcg/l). This individual's chromium level was normal on a repeat test approximately three months later. The EEB has discussed on numerous occasions problems associated with analyzing blood for certain metals for the purpose of determining toxic exposures. After a rather extensive review of the scientific literature and laboratory procedures for determining blood chromium levels, the EEB determined that the first determination was likely a lab error. Both Stokinger (1981) and Lauwerys (1983) concluded that blood chromium levels are of little value in monitoring exposure and Versieck (1984) pointed out the problems of introducing errors with sample contamination. In addition,

that the following points need to be made in light of current efforts underway to site a state-of-the-art hazardous waste incinerator:

1. This facility provides an excellent case study of problems resulting from (a) inadequate incinerator design and operation for maximally efficient burning of hazardous waste, (b) inadequate pollution control equipment, (c) inadequate supervision and education of employees at the facility, (d) inadequate federal and state air pollution regulations in place at the time, (e) inadequate resources for routine environmental monitoring, (f) inadequate resources allocated in general to state agencies involved in overseeing the proper management of hazardous waste, and (g) poor lines of communication between some regulatory agencies. In relation to the new proposed incinerator facility, many of these factors have already been remedied. The remainder can be and should be remedied before any new hazardous waste incinerator is permitted to operate in the State.
 2. Some of the numerous media reports have sensationalized the issues surrounding CSI and provided misinformation or incomplete information to the public. The EES believes that a significant portion of the media coverage related to environmental contamination has been remarkably biased and that little effort has been spent in determining the facts related to specific investigations cited in this document. One reporter who did two in-depth TV stories on the CSI incinerator was personally invited by the EEB to review documents detailing the various components of the State's investigation detailed in this report. He never followed up on the invitation. Other reporters have made numerous erroneous statements in the press which have gone uncorrected. Whatever happened to in-depth reporting and "get it right the first time?"
- The CSI issue is not unlike the Agent White issue in Cherokee County and Macon County in 1982. A free-lance writer visiting the North Carolina mountains attributed elevated cancer mortality rates to the spraying of herbicides along power line right-of-ways years earlier. Without consulting public health officials, he wrote an article "Agent White Kills Weeds, Bushes, Trees, and Maybe People." This article was picked up by news syndicates.

story was run in many newspapers, including the Chicago Tribune, Philadelphia Enquirer, St. Louis Dispatch, New York Times, Washington Post, Orlando Sentinel, etc.. Sixty-Minutes wanted to do a story. Families cancelled summer vacations to the North Carolina mountains; residents called for sampling recreational lake waters for dioxins; and some who had purchased land with the intent of returning to the area to retire wrote letters inquiring if they should sell their land. These are examples of the public being subjected to misinformation and manipulation by the media. This cancer cluster - reportedly due to herbicide spraying - was actually due to in-migration of retirees into those counties. A sufficient number of retirees either had cancer diagnosed prior to moving into the counties or shortly thereafter. When they died, they were residents of those counties. Their inclusion in the counties' mortality statistics resulted in the increased mortality statistics.

This document will provide the public, legislators, and the media with information which is factual and unbiased. It will also put the environmental and health issues related to CSI in perspective. The EEB believes that there should be a full disclosure of all documents referenced in this report so that the media and public can become more informed as to the controversy surrounding CSI.

There have been numerous attempts to point fingers at "responsible" parties. The fact is that federal law (RCRA) allowed this facility (and others similar to it) to operate under interim status for almost 10 years by meeting certain minimum interim permit requirements. Although emission standards for air pollutants under permanent RCRA permit status were more stringent than those under the Clean Air Act (CAA), the federal RCRA regulations related to interim RCRA permit status only required that incinerators meet CAA standards which were essentially those minimum standards for particulates and priority pollutants (CO, NO_x, SO_x, etc.) promulgated under the federal Clean Air Act.

Any members of North Carolina's congressional delegation who voted against the 1984 reauthorization of RCRA which eliminated interim status permits for hazardous waste incinerators, or voted to delay compliance under the Clean Air Act, or voted against reauthorization of the Clean Air Act,

should not criticize understaffed state regulatory agencies which were required by law to issue interim status permits under RCRA with air emission conditions subject to the minimum standards set forth in the Clean Air Act. In addition, state legislators who voted to enact the Hardison Amendment (which prevented North Carolina from adopting pollution standards more stringent than federal standards) and/or voted against its repeal should understand their culpability when adverse effects to the environment or health occurred during the time period that Amendment was law.

In this situation, there was no standard in the federal Clean Air Act for hydrogen chloride. State regulatory agencies derived a hydrogen chloride limit by applying the federally-mandated (RCRA) hourly limit for burning chlorinated chemicals which would translate to an emission standard based on a federal standard.

Regulatory agencies had no medical evidence to document the presence of reactive airways disease in residents living near the facility until May 1987. At that time, CSI was applying for a final (Part B) RCRA permit to operate, and state regulatory agencies had incorporated strict adherence to more stringent air pollution standards as a condition of the final permit. (The EEB recommended that the final permit incorporate a condition that the permittee adhere to the acceptable ambient levels (AALs) for air pollutants, derived by an expert panel of N.C. Academy of Sciences. It also recommended that adherence to the AALs be a condition of permit for all incinerators burning hazardous waste, municipal waste, and medical waste even though these AALs had not made their way through the Air Quality Committee of the Environmental Management Commission at the time.)

4. Each year during the budget process, heads of state regulatory agencies determine what additional staff and funds are needed to carry out their legislated mandates and responsibilities. They submit their requests to budget directors in their respective departments. The budget cutting process starts there and ends up in the legislature. North Carolina agencies involved in the regulation of hazardous waste in the past have submitted requests for additional funds and staff to do the job. Often these requests have been viewed as "wish lists" by individuals who do not have the knowledge or expertise to evaluate the merits of the request.

one year when the EEB (which is non-regulatory) submitted a request for four technical positions, a departmental budget reviewer, without any knowledge of the relative necessities of the positions, told the Branch Head he could only have two positions and then proceeded to dictate which two he could have. Another year, when the EEB requested a toxicologist position, they were told they could not have a toxicologist but could have an industrial hygienist. If the EEB had needed an additional industrial hygienist instead of a toxicologist, it would have asked for one. All of these positions were essential at that time to forming a core staff of professionals who could evaluate credibly the risks posed by environmental hazards found throughout the state. Other state agencies charged with regulating hazardous waste facilities and emissions of pollutants from industries and other sources have their own stories to tell about understaffing and inadequate funds to do the jobs they are being asked (or told) to do.

Further, the Office of State Personnel has demonstrated little, if any, appreciation for additional training or experience beyond the minimum education and/or experience requirements for a position when deriving salary ranges for professional technical staff. In addition, there is no incentive for professional staff to obtain additional credentials or certification in their field once employed by the State. For at least six years during the operation of CSI, merit raises for state employees were frozen by the legislature. During that time, numerous talented, well-qualified, technical staff in regulatory agencies left State government for the private sector. When this happens, valuable knowledge related to facility inspections, specific types of problems, how we dealt with this, how we solved that, vanishes. When admitted to the intensive care unit, we expect well-qualified, seasoned medical and nursing staff to care for us. The public has every right to demand that well-seasoned, qualified regulatory staff be assigned to hazardous waste facilities. North Carolina, the 10th most populated state and the 10th largest generator of hazardous waste, apparently ranks 45th nationally in the dollars it commits to environmental programs (\$12.19 per capita compared to the national average of \$21.98). The bottom line is that inadequate funds

and insufficient staff translate to (a) infrequent and potentially inadequate inspection of facilities by regulatory agencies, and (b) inadequate environmental monitoring for pollutants and their effects. When problems arise that require other than a limited investigation, state agencies usually do not have any uncommitted funds to use toward in-depth evaluation of a specific problem. The EES does not have any discretionary funds allocated for epidemiologic investigations. As a result, the agency has, on many occasions, not been able to investigate issues which deserve investigation.

5. The EES would like to point out that the CSI facility was eventually closed by the Caldwell County Health Director, Dr. Strawn, after declaring it a public nuisance. It is doubtful that anyone could be content very long living downwind from a hazardous waste incinerator operating without pollution control equipment, intermittently belching black smoke and acrid fumes irregardless of whether or not it was in compliance with all current laws and regulations. While the surrounding environment has not shown evidence of significant contamination with heavy metals from air emissions, it was not very comforting for residents to know that these substances were being incinerated and that low levels of heavy metals were being emitted from the stack.

Most of these same metals, as well as radionuclides such as radium, are emitted from coal-fired power plants. Low concentrations of these same metals are also emitted from municipal incinerators. While low levels of dioxins, furans, and other products of incomplete combustion have been detected in federal studies of incinerator emissions, these same substances have been found in rather remarkably high concentrations in the ambient air of certain neighborhoods where woodstoves (without catalytic converters) are used as a major or supplemental source of heat. As one can see, the regulation of air pollution from all sources is a complex problem which will require significant additional manpower and funding in the future. The State has made a major commitment to this effort with the recent adoption of new air pollution regulations that go far beyond federal standards. It remains to be seen if the legislature will back up this commitment with adequate funding.

6. For the past eight years, the Air Quality Section staff in DNRCD (now in DEHNR) tried to establish new air quality standards which went beyond those established under the Clean Air Act. Under two separate unrelated administrations they were unable, until recently, to implement new regulations due to a lack of administrative and legislative support. In addition to constraints imposed directly or indirectly by the legislature, the North Carolina Citizens for Business and Industry lobbied extensively (for approximately four years while CSI was operating) to defeat adoption of North Carolina's first comprehensive set of "air quality standards" (AALs) which were scientifically derived by an expert panel of health professionals appointed by the North Carolina Academy of Sciences. These AALs finally made their way through the Air Quality Committee and were recently adopted by the Environmental Management Commission (EMC). They will become a mandatory component of any new permit issued to the operator of a hazardous waste incinerator. However, it should be noted that AALs exist for only approximately 80 chemicals, whereas the incinerator waste stream may contain up to 350 chemicals. It is imperative that the state move forward on the derivation of additional AALs. NOT EPA
HMI REG.
CRITERIA
7. Because air monitoring is not sensitive enough to evaluate compliance with the AALs, Air Quality must rely on air emissions modeling to determine compliance. However, modeling for many chemicals will be very difficult due to wide variations in the chemical waste stream being incinerated on any given day. ACCEPTABLE
AMBIENT
LEVELS
- HIGH TECHNOLOGY WILL NOT PROTECT PUBLIC HEALTH
- In order to convince the public that a new state-of-the-art incinerator equipped with optimal pollution control equipment is not emitting chemicals or metals in excess of the established AALs; it will be necessary to demonstrate on a regular basis that 99.99% destruction and removal efficiency is being met and that pollution control equipment is operating efficiently. A document should be prepared detailing the difference between the CSI incinerator and the new one. Details as to incinerator design, combustion temperature, retention time, and how specific pollution control equipment and monitors will operate should be included. Schedules for stack testing and the detailed components of inspection should be noted. Specific information related to the emission plume and maximum point of deposition should be described.

The EES strongly suggests that sufficient background sampling of the environment be conducted, particularly for metal content in soils, so that a known reference base will exist when future environmental monitoring is conducted. Every time environmental sampling is conducted, a certain number of samples should be split and sent to different laboratories for analysis. The EES already has been contacted by anxious dairy farmers and owners of fruit orchards downwind from the two proposed sites concerned about the possibility of contamination. The EEB believes that the only way residents can feel secure is to be a participant in the environmental monitoring process. The EEB strongly suggests that the county of the chosen site should receive funding to hire at least one qualified technical staff person who would be an employee of the county and who would have 24-hour onsite inspection authority.

The EES also believes that, as a condition of permit, the facility should be required to have a certified industrial hygienist on site 24 hours a day to monitor the worksite and work practices and that the operator have in place a medical monitoring program for employees either peer-reviewed or executed by physicians recognized in the field of occupational medicine. Such a medical monitoring program could be carried out by one of the regional university-based medical facilities on a contract basis.

Finally, as a condition of permit, the operator should be required to (1) document that individuals placed in key operational positions for the facility (those which would relate to safety, as well as proper and efficient operation of the facility) are qualified through a combination of education, training, and experience, and (2) document that all workers exposed or potentially exposed to hazardous waste complete an orientation program emphasizing occupational health and safety issues relevant to the handling of hazardous waste, and (3) develop a continuing education program for employees emphasizing the same.

8. There apparently were some interdepartmental communication problems related to the regulation of this facility under two different administrations. Some of this may have been due to the fact that the permitting agencies for the air quality permit and the hazardous waste (RCRA) permit were located in different departments which historically had turf battles. In September

1988, when the Governor asked for a full report on the history and operation of the facility, the EEB learned that the Air Quality Section had received approximately 100 complaints, many of which described health problems. Some of these complaints occurred in the previous administration. The majority of these complaints were never referred to the EEB for evaluation and the first one did not appear until September 1986. The recent consolidation of environmental and health agencies into the new Department of Environment, Health, and Natural Resources should prevent similar problems of communication among agencies in the future.

9. The EES has not seen any results from environmental sampling of offsite soil and groundwater which would constitute an imminent hazard to public health. It is clear that groundwater contamination with volatile organics has occurred both onsite and offsite. The concentrations were very low (near EPA established MCLs) in 1987 and have remained in the same very low range based on testing as recent as 1989. As mentioned before, the very low concentrations found in one well (Haas) used as drinking water were associated with a very low lifetime cancer risk approximately 1/2 that associated with consumption of public drinking water contaminated with the same or similar volatile chlorinated organics which result from chlorination. The risk associated with the Haas well contamination is orders of magnitude less than that associated with the levels of THM contamination found in 1989 in the City of Washington's public water supply, or with the levels of lindane contamination found in Aberdeen's public water supply. These very low concentrations currently present less risk than concentrations of volatile organics routinely associated with the hundreds of private wellwater contaminations across the state resulting from leaking underground gasoline and fuel tanks or with the levels of chlorinated pesticides, such as chlordane and heptachlor, which have contaminated private wells across the state as a result of misapplication of termiticides.

After testing four other wells in the vicinity of CSI and finding no evidence of contamination, the EEB recommended that the Haas well be monitored every six months and that the SHWMB and the Groundwater Section evaluate the source and extent of groundwater contamination. Based on the

soil gas determinations (primarily onsite) determined in the EPA-PRC study, it is reasonable to expect that the degree and distribution of groundwater contamination may increase in the future. It will be important to characterize the plume and rate of migration. The EES will be working with state and federal agencies in the near future in determining what additional groundwater monitoring might be required around CSI.

10. The adverse respiratory effects in residents downwind from the facility are similar to those which have been reported in the past and are currently being reported to the EES by individuals residing near certain other industries in North Carolina which release irritant chemicals in their air emissions. The EES has been unable to make site visits to these areas due to budget cuts.

It is known that phosgene (which is a severe pulmonary irritant used in World War I and not a nerve gas used in World War II as attributed to Dr. Guerra in a news article) may occur as a product of incomplete combustion of volatile chlorinated chemicals. Many solvents used in the furniture industry and other industries are volatile chlorinated organics. Until hazardous waste incinerators appeared, it had been standard practice by many North Carolina industries to utilize waste volatile chlorinated organics as fuel for their furnaces. This practice is still occurring in North Carolina.

11. The three documented cases of neurological illness in former CSI employees and the report of an infant born with multiple congenital defects to the wife of a former worker are personal tragedies for the individuals involved and their families. The EEB did not obtain any evidence (other than circumstantial) that the case of birth defects was associated with indirect occupational exposure from CSI. While there is evidence to support a causal relationship between work at the facility and the neurological illnesses, the EES questions the practice of parading these individuals before the public as examples of adverse health effects specific to hazardous waste facilities. Psychosis, polyneuritis, and tremor have been documented in workers in the rayon and rubber industries exposed to carbon disulfide. Similar debilitating neurological illness has been associated with prolonged occupational exposure to solvents in lacquers and oil-based

paints. Pick up any can of solvent-based paint primer or stain killer and you will find the following warning: "Use with adequate ventilation. Notice: Reports have associated repeated and prolonged occupational exposure to solvents with permanent brain damage and nervous system damage." And these illnesses are not dissimilar to debilitating neurological illnesses and adverse reproductive outcomes that have been documented (during the same time period that CSI operated) in health professionals in North Carolina occupationally-exposed to mercury and waste anesthetic gases. During the same time period, two workers cleaning the inside of a tanker truck with methylene chloride, a common solvent, died because they did not take appropriate safety precautions.

The adverse health effects associated with the CSI facility are testimony to the potential hazards associated with the operation of a hazardous waste incinerator or, for that matter, any hazardous waste facility. The occupational and environmental hazards associated with a hazardous waste facility are not unique. However, they are more complex. Similar occupational hazards can be encountered in the workplace of a number of industries in North Carolina, and similar environmental hazards can be encountered as a consequence of emissions from a number of industries located within the State. One only has to pick up a textbook or journal on environmental medicine, occupational medicine, or industrial hygiene to comprehend how widespread these same types of hazards are. Prevention of occupationally-induced illness and injury in any work setting is related directly to the education of employers and employees about potential hazards and risks, their respective commitments to minimize these hazards and risks, and the ability of an outside authority to regulate and evaluate this commitment through detailed inspections and monitoring. Similarly, prevention of environmentally-induced illness and injury is related directly to the education of employers and the public about potential hazards and risks, their respective commitments to minimize the hazards and risks, and the ability to regulate and evaluate this commitment through detailed inspections and monitoring.

THIS WILL NOT
CUT THE PROBLEM